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IRRIGATION

CALIFORNIA, NEVADA, OREGON, ARIZONA

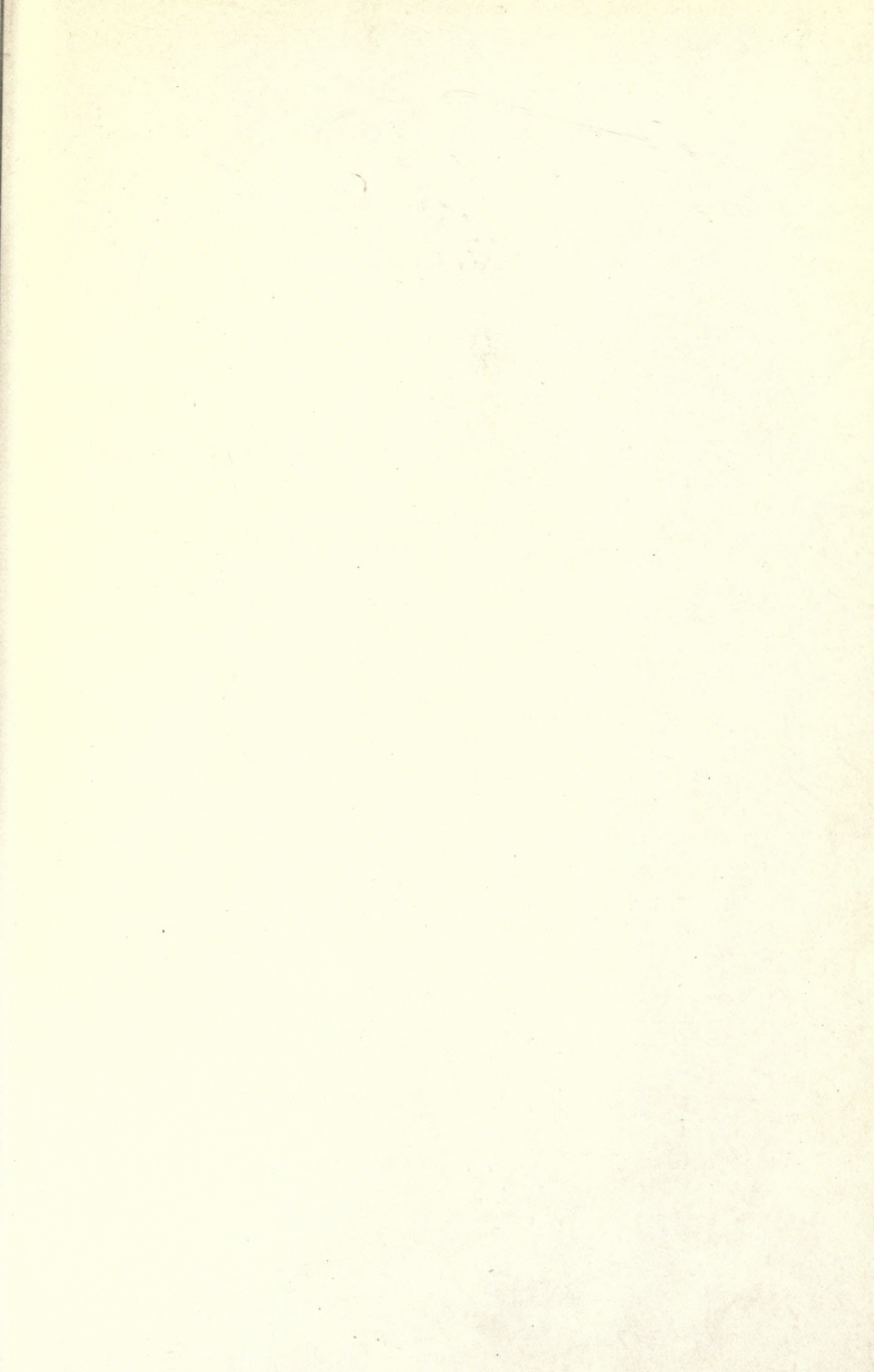


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Introductory



IT is the aim of this Booklet to present the larger aspects of certain National Irrigation Projects on the Pacific Coast and on the lines of the Southern Pacific Railroad. It does not answer questions of detail, nor supply information about acquiring public lands and settling on these projects. That has been done quite fully by the Reclamation Service in a series of convenient little handbooks. They are written in answer to a great variety of questions and will be sent to all inquirers upon application to the constructive engineers of the various projects at the addresses given below, or the Southern Pacific Passenger Department.

Our aim is to show the varied natural advantages of the irrigable lands included in the projects we describe, and to help the prospective settler decide between them. We try also to present some of the larger features of the National Irrigation Movement, and to interest the settler in the work which the Government is doing in his behalf.

A chapter is added to include Imperial Valley, which though privately irrigated is an object lesson for any who may still doubt the value of irrigated agriculture, but who are debating the new opportunities offered the homeseeker under the terms and with the facilities afforded by the United States Reclamation Service.

Orland Project, address Constructive Engineer at Orland, California.

Klamath Project, address Constructive Engineer at Klamath Falls, Oregon.

Truckee-Carson Project, address Constructive Engineer at Fallon, Nevada.

Salt River Project, address Constructive Engineer at Phoenix, Arizona.

Yuma Project, address Constructive Engineer at Yuma, Arizona.

The Statistician, U. S. R. S., Washington, D. C.

Information Bureau, U. S. R. S., 777 Federal Building (P. O.), Chicago, Ill.

Government Irrigation and the Settler

CALIFORNIA, OREGON, NEVADA and ARIZONA
INCLUDING A DESCRIPTION
of the
IMPERIAL VALLEY PROJECT

By A. J. WELLS



Esifo

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"The Shadows of Departing Day." The Colorado River at sunset. The River is the base of the Yuma and Imperial Valley Projects.



Government Irrigation

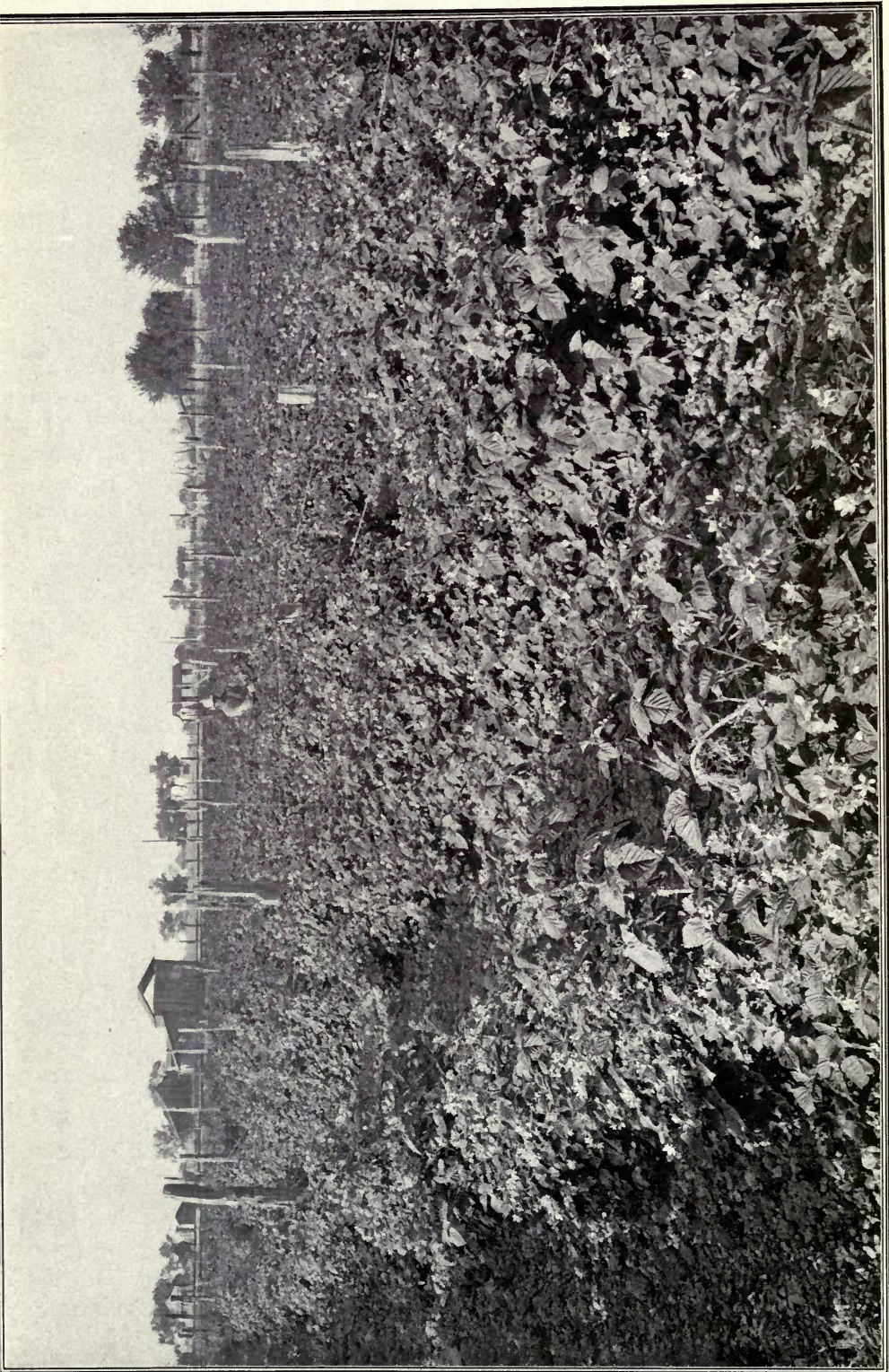
IT is not quite eight years since the Reclamation Act was passed. In that brief period a great national movement has been organized, and more than \$50,000,000 invested by the Reclamation Service. Not only so, but it will require \$50,000,000 more to complete the projects now under way in the West, the Northwest and Southwest, and this amount will be expended in the next three years if Congress will meet the special exigency and advance the money. The results of this vast expenditure are placed at the service of the settler, at the actual cost of work done and without asking for interest on the money invested. Not a dollar has been taken from the pocket of the tax payer, and not an acre has gone into the hands of a speculator. The working of no system is perfect, but here the work has been safeguarded with much care, and has been done for the benefit of bona-fide settlers, and homes have been erected for many thousands under the most promising conditions. Opportunities have been made for a large body of citizens to own land—good land, passed upon by experts after careful examination—land well watered, in area sufficient to support a family, and under the best irrigation systems which money and skill could construct.

No charge has been made for the land. The land is given away under the terms of the Homestead Act, and the Government simply recovers the actual cost of the water. Where lands are held in private ownership, this ownership is limited to 160 acres, and the rest is required to be sold to actual settlers. The practical working of the Service is to reduce the acreage under one holding, and to provide as many homes as possible on the lands available for reclamation.

Now it is worth while to ask what all this means. It is a new thing in our history, a new departure in the functions of government. What is behind it?

DEVELOPMENT OF RESOURCES

The nation is actively engaged in adding to the productive area of the country. Exclusive of Alaska and outlying possessions, one third of the whole United States is vacant public land. Most of this is untillable, but a vast area can be made productive and capable of sustaining a large population. The reclaimable area is estimated at 30,000,000 acres, and this will provide homes for a million families in part on the land itself, in part in the urban communities which will spring up in the midst of the new farms.



Loganberries at Orland. This delicious fruit, with other berries, is raised here in great quantity and high quality.

If we consider only the twenty-five projects upon which the Government is now at work, these will add 3,198,000 acres to the crop producing acreage of the country. Thirteen other projects are in abeyance, pending completion of the first series, and these will add 3,270,000 acres, or a grand total of 6,468,000 acres. This great area is today practically worthless, yet potentially it is fertile and productive. It has been pointed out that if we take only the acreage now being reclaimed, it represents an area equal to the cultivated acreage of Connecticut, Massachusetts, New Hampshire and Florida. Suppose these new lands return equal revenues per acre with the states mentioned, and make homes on farms and in towns and villages for 80,000 families, the taxable property of the nation would be increased \$232,000,000 and the value of farm crops by \$60,000,000. This is worth while. It is home making; it is the development of natural resources; it involves national prosperity; it adds stability to national life. The most valuable citizen, other things being equal, is the man who owns the land from which he makes his living. The wandering laborer, the restless miner, the lonely herdsman, add little to the strength or safety of a community. But attach one of these men to the soil, let him own a small farm and he becomes a citizen who can be depended on and will add to the stability of those institutions which we most highly prize.

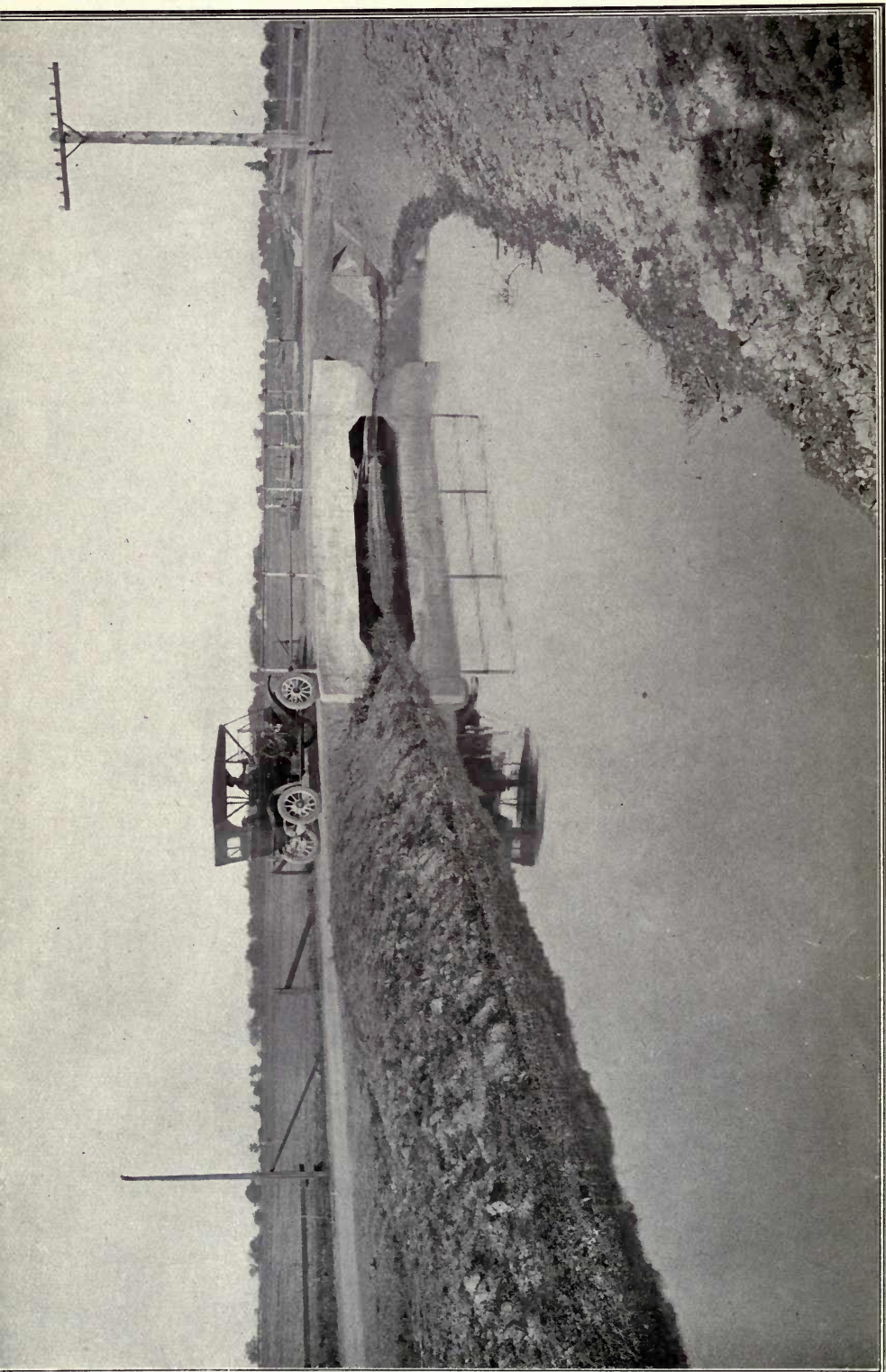
DEMAND FOR FARM LANDS

The need of homes for men who live by the soil is a present need. It is but fifty years ago that unoccupied farm land could be found within 100 miles of Chicago. Now from the Mississippi Valley to the Pacific the land is opened up and fairly populated, and the wave of emigration is turning back and filling up the places that were passed over. For the first time in our history as a nation, thousands from the Middle West have gone into British Columbia, seeking cheap lands in the bleak Canadian Northwest. What explains it? The increase of population; the speculative abuses of our land laws; the exhaustion of the land itself by unwise farming; and the waste by floods due to forest destruction. We hardly realize the destruction over wide areas by soil erosion due to the cutting of timber on the hills, nor do we realize the extent of soil exhaustion in the older states. Farm life is unprofitable over much of New England; the hilly sections will no longer yield the farmer a support. New Hampshire, Vermont, Northern New York and Western Massachusetts have "abandoned farms," and the process of deterioration is affecting the farm lands of Western New York, Ohio, Indiana, Maryland and Virginia. The average yield per acre over the whole United States shows a farm product of but \$11.38—but little more than a respectable rental for first-class land. Only two states in the Union show a total value of farm products exceeding \$30.00 per acre of improved land.

That this is partly due to single cropping and to want of fertilization, is doubtless true, and as an abuse may be remedied, but the fact remains that from various causes the land will no longer provide for its increasing population. Experts figure that at the present ratio of increase we will have a total population of 130,000,000 in 1925. How then will men without farms get them?

This is behind the work of the Reclamation Service—the needs of the farming population—the demand for good land—the necessity for providing for an increasing rural population, and of developing lands now unproductive upon which can be built independent homes for the nation's citizens.

GOVERNMENT IRRIGATION—SOUTHERN PACIFIC



The Government Canal, one and a half miles west of Orland.

NATIONAL HOME-MAKING

"A free home for every family" is the American ideal. The natural unit of society is the family, and the homestead is the condition of independence. It is the first acquired capital. The ambition of the normal American citizen is to own a home and the bit of land upon which it stands, and to pay toll to no man for the roof-tree that shelters him. Especially does he aspire to own the land that feeds him. We do not take kindly to tenant farming, and are proud of the host of men who live on their own land calling no man master. But the independence of the American farmer is slipping away from him. The ownership of the American home is declining. Glance at this table:

PROPORTION OF FARM OWNERS AND TENANTS

	1880	1890	1900
Farm Owners	74.5%	71.6%	64.7%
Farm Tenants	25.5%	28.4%	35.3%

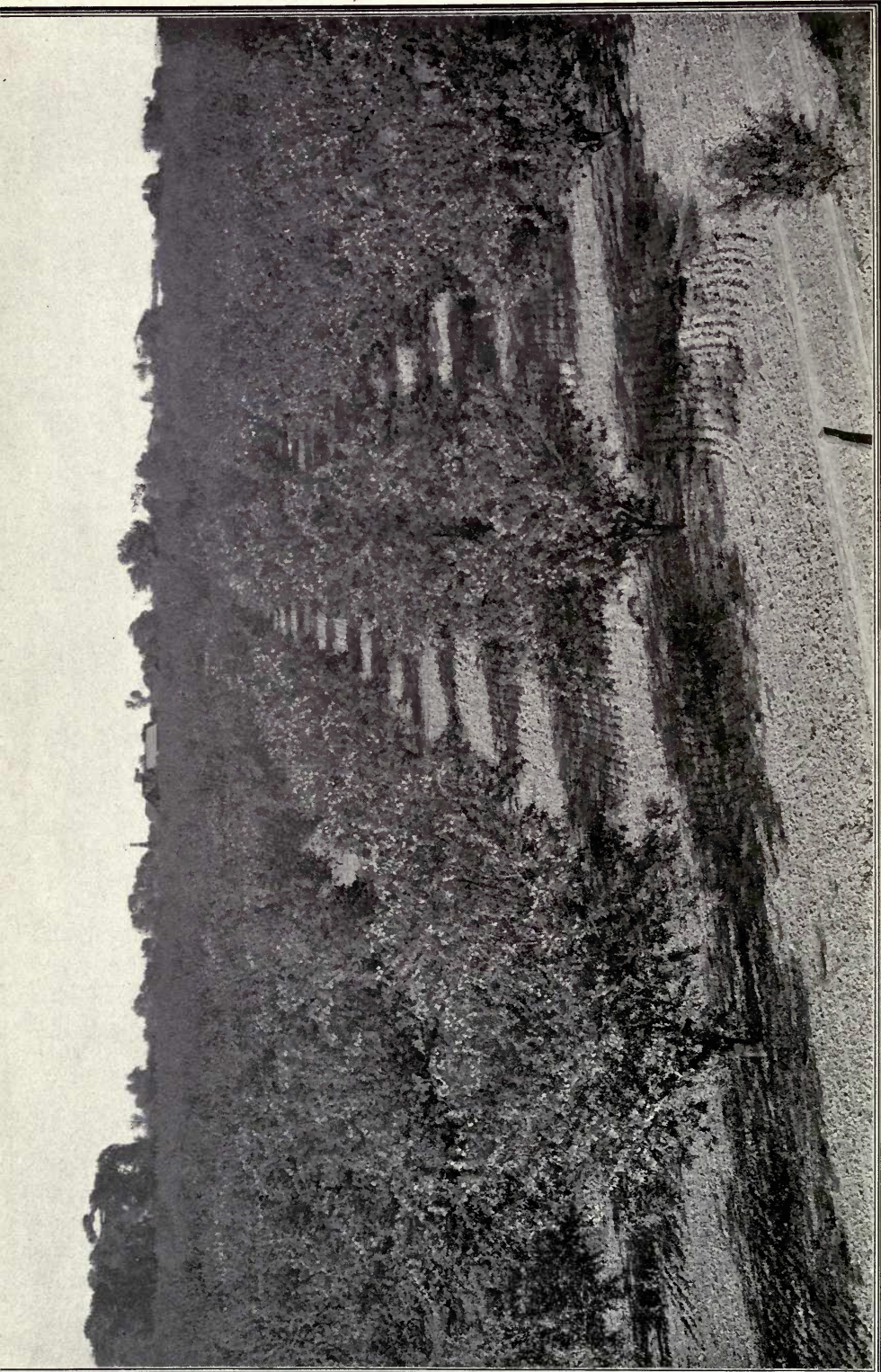
This shows that in twenty years one-tenth of all the American farmers were changed from owners to tenants. The decline is not sectional, but is nearly uniform throughout the country. It is a grave situation. The roots of national prosperity are deeply fixed in the soil and in the individual ownership of the farm. And no movement so powerfully combats the tendency toward tenant farming as the creation of homesteads under the Reclamation Act. The free man is the man who controls the sources of his own support. The tenant must take the most overworked and impoverished land and raise the least profitable crops. He has no fixed place of abode. His annual rent is a perpetual debt and himself and family are mere driftwood. He shares but little in the general prosperity. All times to him are hard times. The most important step in national progress is the effort to provide homes for the men who desire to be independent and own the land they live on.

THE NEW FARM LANDS

They are in the arid and semi-arid belt. Some of them are under desert skies. But it will occur to you that the Reclamation Service is not developing these lands as a makeshift; that the Government cannot afford to provide water at great expense for poor lands. These western lands are selected not simply because they are irrigable, but because they are fertile and will respond at once to cultivation when moisture is supplied.

You are familiar with the fact that the ancient civilizations began in the arid lands, but it has remained for modern inquiry to show why. The ancient races chose the arid lands because they were better than the humid lands. The soil expert today will tell you that the extraordinary fertility of arid lands is a quality inherent in aridity itself. The soluble substances which make for fertility are not leached out by the rainfall of centuries, carried into the country drainage, and thence into the sea.

They remain in the soil and accumulate by the weathering of rocks in the hill regions, by the chemical processes which go on in the soil, and they become available for the plant life in the farmers' fields to draw upon. And the soil analyst will tell you that the soils of the arid region lying west of the 100th meridian, as compared with the soils of the humid region lying east of the Mississippi, contain on an average three times as much potash, six times as much magnesia, and fourteen times as much lime. This is the scientific explanation of the fertility of arid lands, and it may be accepted as true, that



A well cultivated almond orchard at Orland. Deciduous as well as citrus fruits flourish well in the Upper Sacramento Valley.

the average arid soil is equal to the most phenomenal soil of the east. And Egypt, India, China and other regions of the ancient world, phenomenally productive for thousands of years, are in evidence to assure the settler that these Western Arid lands will not disappoint him.

THE GAIN OF IRRIGATION

It is too late to discuss the advantages of irrigated agriculture, and we call attention to it chiefly to say that the man who comes to settle on land in any of these projects should come with definite convictions and not as an experimenter. Irrigation is ancient; it is becoming modern. It is scientific agriculture. It is common sense applied to the chief problem of the farm, that of production. It is an insurance against crop failure, and with sure crops, larger crops, and crops of better quality, the farmer's business ceases to be a lottery and he becomes master of the situation. This is especially true under right climatic conditions. Over the dry lands we have mild airs, the maximum of sunshine, an absence of cyclones and atmospheric disturbances, and great equality of temperature. With helpful weather as one of the certainties, and with moisture at command, the intelligent farmer knows very definitely what he can do: his work is taken out of the realm of uncertainty and himself off the rack of anxiety.

The social side of irrigation is seen in the smaller farms and closer neighborhood, and this brings good roads, schools, farm telephones, churches, libraries, rural delivery of mail and a social situation impossible where big ranches keep families far apart. In irrigated districts in California, the town and the country grow together so that it is difficult to tell where one ends and the other begins.

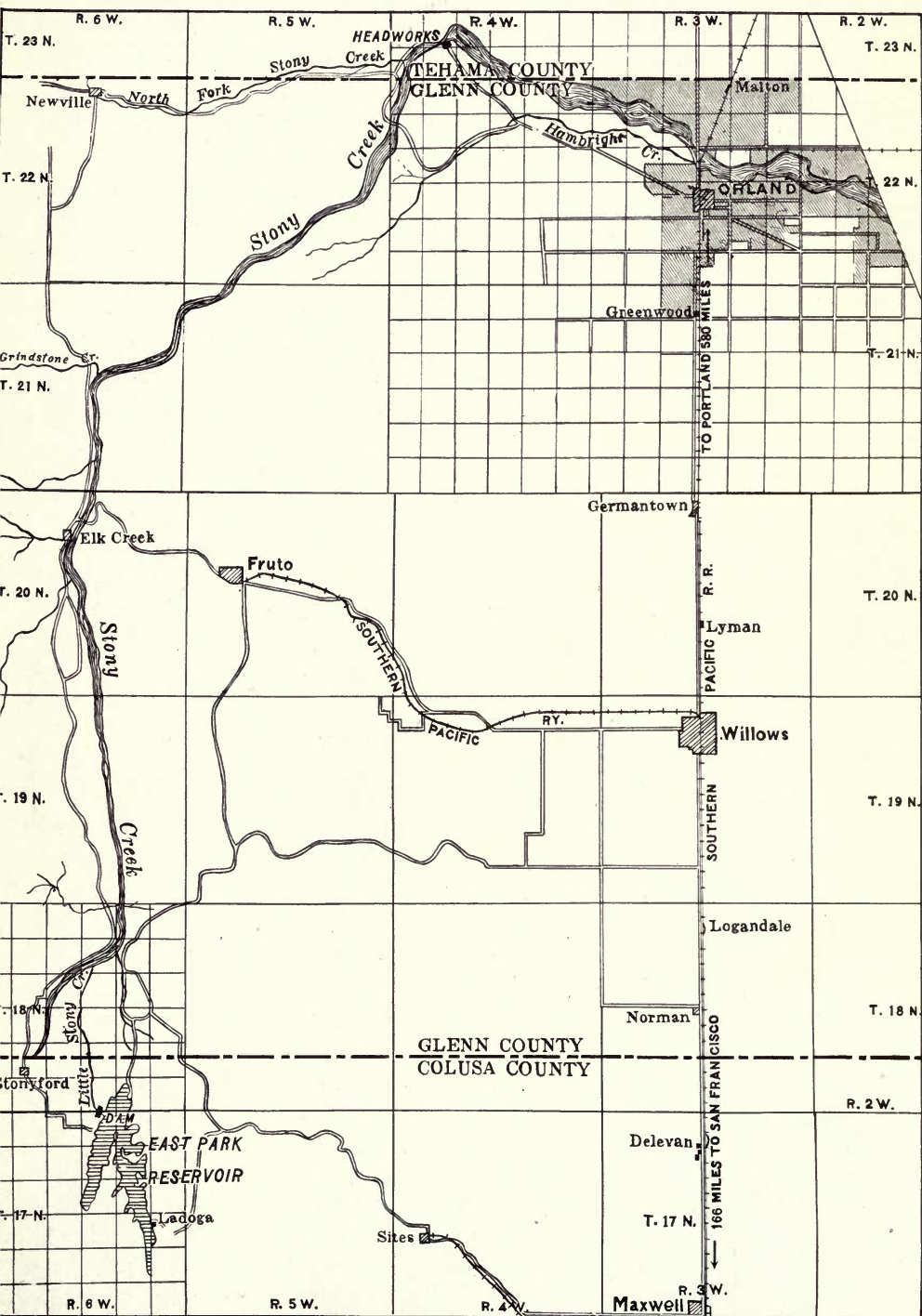
THE BEST FARMERS WANTED

The Director of the United States Reclamation Service, Mr. F. H. Newell, says: "The West is developing rapidly. We are putting good substantial settlers on forty-acre tracts. They are men of large families. This dense population means much for the country and for the settler."

But the Director adds a word of caution: "The irrigated countries are no place for the poor farmer. The man who goes there must use his brains in all his farming. He must be willing to learn. He must work hard, and he must have some capital."

This, of course, is but common sense. The amount of capital which a man must have cannot be well stated. It will vary with conditions, and will depend largely upon the man himself. Fair estimates are made by the Reclamation Service of the cost of living, and provisions are made to help the settler by advice, by expert knowledge, and by actual demonstrations on experimental farms, where tests of soil and seed of plants, and of crops adapted to the region, will be constantly made by the Service and not at the expense of the settler. The best methods of cultivation, the best way of applying water, the best fruits to grow, when to sow this crop or that—all will be proffered the farmer who is willing to learn. As compared with the old days of hard knocks, of exhausting labor, of bitter and costly experience in hewing out a farm from the thick woods, in an unknown region and subject to the vagaries of a harsh and uncertain climate, this irrigation is but kindergarten work, where the learner is supplied with soil especially selected, with water when his crops need moisture, and with expert advice how to plant and sow, how to cultivate, and how to spread water.

GOVERNMENT IRRIGATION—SOUTHERN PACIFIC



Map of the Orland Project—Irrigable lands shown in shaded sections.

Yet it is true that this new agriculture requires brains, and that success is conditioned upon intelligence. It is high class farming and involves planning, attention to details, careful cultivation, knowledge of plant life, and ability to decide what to do next. The man who merely works never gets on. If working could take the place of thinking, every mule might get rich.

It is of first importance that men settle upon these irrigated lands who have imbibed the spirit of the new agriculture, and know, as their fathers did not, the possibilities of an acre. To such the Government is offering opportunities, and the right kind of farmers will "make good." The faith of the Government is pledged to this, and the sale of these irrigated lands and the success of the farmers on them, will add greatly to the prosperity of individuals and to the permanent wealth of the nation.

In what follows descriptive of the general situation on several of the great irrigation projects of the Pacific Coast, the writer has the advantage of long residence in the West and of intimate personal knowledge of the lands described. There is no purpose to "Boost" these projects, but to give them a fair setting, and show them to the prospective settler as they are, letting the facts speak for themselves. We can say many things about these lands which the officers of the Reclamation Service do not care to say, and our aim is to supply such information as the settler needs and cannot find elsewhere.

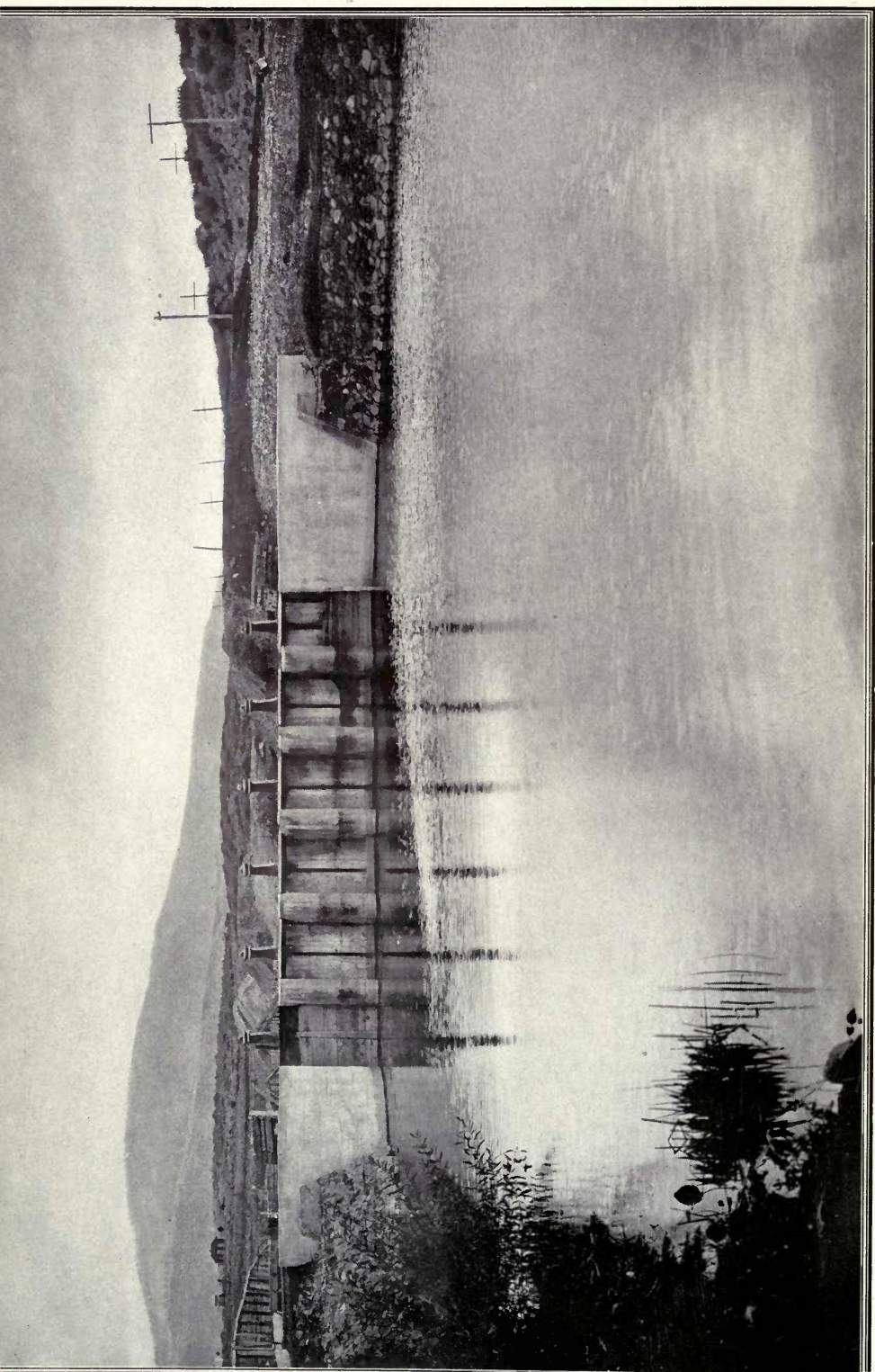
The Orland Project California

ORLAND is in Glenn County in the upper portion of the Sacramento Valley. The project located here is one of the smallest, but there are reasons why it is of special interest and importance. These reasons are, briefly, that it is the first step in a great and comprehensive system of irrigation and drainage, under Government control in a valley which is naturally as fertile and productive as the Nile Valley of Egypt. In considering the Orland Lands the settler will naturally take into account not simply these particular lands, but their location, their setting, the general character of the soil area to which they belong, the climate and products and probable future of the region.

THE SACRAMENTO VALLEY

This is one of the great valleys of the world, great in area, in fertility, in beauty and productiveness. It has a level surface of 2,661,120 acres and a foothill region which is extensive, fertile and attractive for homes. The whole forms an almost continuous body of very desirable land, the percentage of waste being relatively small, and the most of that capable of being reclaimed and made productive. The great width of the main valley gives it the appearance of a plain, and as much of it is dotted with wide-topped oaks, standing singly and in groups, it has the beauty of an English park. Over it all spreads the charm of the typical California climate and all that has made the fame of Southern California in recent years is here in climate, in products, in far greater area, in a more abundant water supply and greater natural resources.

The settlement of the Sacramento Valley has been delayed by the ownership of the land in great tracts, but the decline of wheat farming, the development of irrigation in



Head-gates of the Government Irrigation Ditch at Klamath Falls.

various parts of the valley and the increase of the population has given to the land a greater value and it is now being subdivided and placed on the market.

VALLEY SOILS

Once a part of the sea, or a northward extension of the bay of San Francisco, the valley of the Sacramento clearly shows that it has been created by rivers and streams, by erosion from the giant hills which shut it in. The soil is of very great depth, generally it is loamy, and the difference between soil and subsoil is here very slight. Hardly a perceptible change of tint or texture is found in going down several feet, and material from a considerable depth when thrown up is fairly equal in fertility to the original surface soil. That it is at once productive, and does not have to lie and be weathered, or to be cultivated, stirred and mingled with the surface soil is one of the surprises of the man from the humid states. It is all probably an effect of climate.

The newcomer from clayey lands will look askance at some of the light textured soils of this valley, but experience shows them to be very fertile and lasting. He will need to remember that the soil here is semi-arid, that there are no torrential rains and no rains at all throughout half the year and that therefore the chemical elements upon which plant life depend have not been wasted. Plant food has accumulated and the process which created these rich acres goes on repeating itself, recreating the soil year after year.

For half a century these valley lands have been farmed not only without fertilizing, but the stubble of the fields has been systematically burned every season. Farmed to one crop, and after the most reckless and exhaustive forms of agriculture, the land is not worn out, but under irrigation and crop rotation these old wheat fields produce heavily, and the new agriculture is increasing both the tonnage and the value of the products of the land.

This the Orland settler will find around him; a great valley and a great body of fertile and beautiful land.

A GREAT POPULATION

This will come in time, and the time will not be long. The waiting period is past. The necessary evolutionary steps have been taken; the order of industrial development has been progressive; first the stock ranges then the big wheat ranches and now the diversified and intensive agriculture made possible by irrigation. Growth has begun in the only way in which it could go on to the full development of the soil-wealth, and to the creation of an adequate agricultural population. It will go on by the attraction of the agricultural opportunity here, and by the pressure of the agricultural situation elsewhere. The soil, the climate, the special fruits of the region and the wide range of farm products will so attract settlers that there will not be room for the many who will seek a foothold here, while the exhaustion of our public lands, now practically at hand, and the pressure of population in the older sections of the country, will send a tide of homeseekers streaming into this valley of the West until every acre is occupied.

This again is the situation of the settler on the lands of the Orland Project; he will not want for neighbors. A vast community is organizing on every side of him. This is the first reason for interest in the Orland Irrigation Project; a great fertile valley, that in time will have an immense population.

A second reason for your interest in this project relates to the reclamation of the whole valley.



In the Klamath country. Cleared lands to the left of the Ditch, natural vegetation on the right.

PLAN A GREAT FUTURE

It has been the hope of the Reclamation Service to provide a comprehensive system so that it might be irrigated, drained, its flood waters controlled and the river made available for navigation. It is worth while to understand the relation of the Orland Project to this plan. It was considered the first step. The engineers spoke of it as the "first unit." The whole enterprise was so vast, so expensive, and involved so much time in its execution that it was proposed to do the work in sections or units as rapidly as funds would permit. In acknowledging the application of land owners above Orland for the construction of a second unit the then Secretary, James R. Garfield, said that it was the intention of the Department to proceed with this and other units as funds became available, and he took further occasion to say that "the plan was of national importance."

It is only fair to say that this larger plan is now "in the air," owing to developments in the general work of reclamation, but there will be no delay in providing water for the irrigable area, both by the Reclamation Service and by private enterprise.

Since these paragraphs were written large sums have been invested in this part of the valley by Eastern capitalists, greatly extending the area to be irrigated and colonized, and by the time the settler is well established on his Orland lands he will find himself in the midst of a great irrigation district, reaching far beyond the county lines.

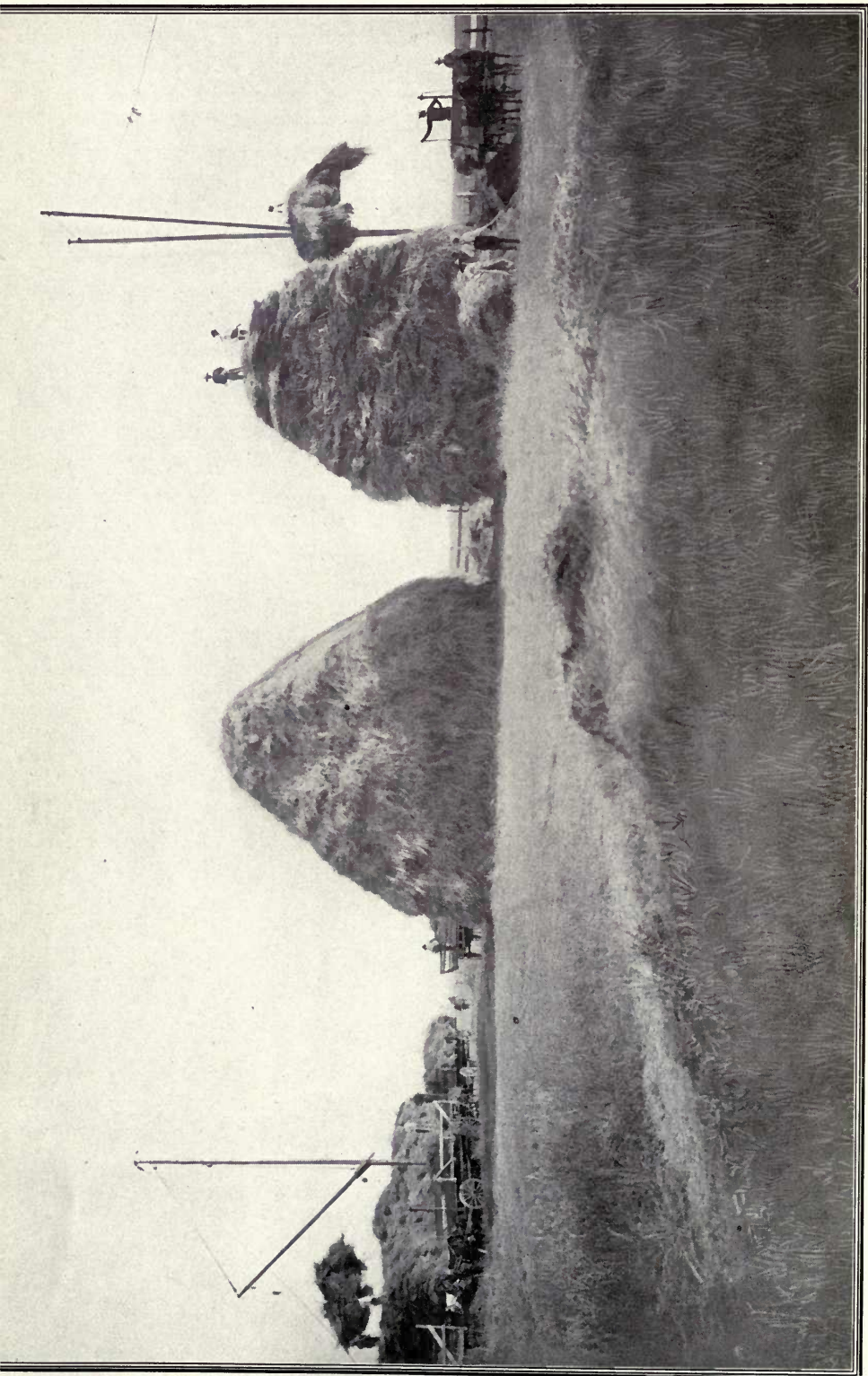
The Officers of the Reclamation Service have been profoundly interested in this valley, seeing in it one of the greatest of all the fields for the practice of irrigation. They have been attracted by the large area of available lands, by the facilities offered for storage reservoirs, by the abundance of water, and the natural facilities for its easy distribution, and by the especial advantages of the climate.

While the Orland Project covers but 14,000 acres it is believed that this will be increased to 50,000 acres by the construction of additional reservoirs on Stony Creek, three more having been surveyed and recommended.

The valley has awaited settlement for years, chiefly because of the occupation of the land in large tracts, and when the great ranches began to be broken up, settlers still stood aloof because of the impossibility of doing diversified farming successfully by dependence on the rainfall. Now that the Government has taken up the plan of a comprehensive system of irrigation, settlers are coming into the valley, lands are being occupied, private irrigation is expanding on every side, and the valley is certain to have a great future. This affects of course, the question of a holding in the Orland lands, as it affects the value of his lands, and a man may count himself fortunate to get a foothold where in time he will pay for his land and his water right, and by that time be part of such an enlarged community that the very increase of population will add immensely to the market value of his own acreage.

THE CLIMATIC FACTOR

Do not shy at the word "Northern" applied to California. It has no significance. Northern California has substantially the same climate as Southern California, as warm summers and as mild winters. Here we are in the latitude of Central Spain and of Southern Italy, and the same physical causes which affect that classic region around the Mediterranean, determines the climate of Interior California. It is even a fact that oranges ripen here some weeks in advance of Southern California, the reason being that this valley is more remote from the ocean and shut away from the sea breezes, has a higher aggregation of heat units without being appreciably warmer.



Stacking alfalfa hay in July in the Klamath Lakes region.

Now this is a fact of practical value. Coming here, you come into the climate of the orange and the palm, of the fig, the almond and the magnolia, and you have the same wide range of products which in the south has made the fame of California, while here the lands at present cost very much less.

Let the farmer emphasize the long growing season, the possibility of two crops on the same land in one year; the fact that the great planting month is February, and that plows are going from November to March, that he can plant something every month in the year, and choose from a wide range what he will grow; that the cost of getting started in such a region is affected by the rapidity with which things grow, the slight shelter which stock require, the inexpensive house which he builds and the little fuel it takes to warm it and the little cost of wintering stock where they have green feed in the fields at all times—let him give these things due weight and he will have the general relation of climate to his work. It has a cash value.

RANGE OF PRODUCTS

The staple crop here at Orland under private irrigation is alfalfa, but oranges and lemons will now be largely planted. Table grapes are grown, figs and deciduous fruits of all kinds, berries and vegetables and corn, rice, sorghum, millet, maize and hemp, can all be successfully grown. We could put into a line what cannot be grown here, but the catalogue of available products is very large.

The dairy will be a feature of farm life, and the production of live stock. Under irrigation, alfalfa can be cut six times, and that valuable forage is most profitable when fed to stock.

Sugar beets will be largely grown in the region, a large factory being on the river in the immediate vicinity, but what the individual on these project lands will elect to grow, will depend upon himself and upon the size of his holding.

THE SMALL FARM

By the terms of the Reclamation Law, no farm under any project will contain more than 160 acres. In this project the lands are all in private ownership and holders of tracts in excess of 160 acres are under agreement with the Government to dispose of excess holdings. The farm limit here is forty acres, and large tracts will be subdivided into tracts not exceeding forty acres in size. That many units will not exceed ten acres is fairly certain, as the land is very productive and capable of intense cultivation. The best informed men believe that in this valley forty acres are luxury, and that comfort will be found in half as much. A good living may be found on ten acres, and the Reclamation officers believe "that as these lands are settled and increase in value, the farm units will be reduced to five and ten acre tracts." If so, it will be at once a matter of economy and a matter of experience. Few men would trust themselves on five acres if it had not been shown again and again, in every country of the world, what an acre will produce. Denmark is one of the prosperous countries of Europe, and Denmark has 150,000 farms of from seven to ten acres, and supports 167 persons to the square mile. The Netherlands have a smaller area and a larger population supporting 448 people to every square mile.

We may not care to live as European farmers do, but the small farm is coming chiefly as a result of better methods of farming. The average man will take better care of twenty acres of irrigated land and cannot practice intensive culture on more without hiring





Wheat on the Glenn Ranch at Klamath Falls, between Upper and Lower Klamath Lakes.

UNIVERSITY OF CALIFORNIA

help. But here it is not a question of twenty acres, if you wish forty, and in this climate and out of this soil the skillful farmer can lay up money for the proverbial "rainy day."

LAND VALUES

If these seem high, remember that this is not a region of cheap lands. Several things affect land values. Thus, this land is rated high in intrinsic value, because its soil is among the best in the world; because it is land with a climate; because it is land with a superb water system; because it is easily irrigated and finely drained.

It will be difficult to water-log this land by wasteful methods of using water.

But the real value of the land must, after all, be based on its income producing power. Thus, land that will return ten per cent on a valuation of \$400 an acre is not high priced at \$250 per acre. Lands in alfalfa are now worth this amount, where raw land can be bought for \$100 an acre. Add to this the cost of water right,—not yet fixed, but approximately \$50 an acre, and very valuable lands are acquired at a normal price. The cost of delivering water is now assessed upon a small acreage. Additional reservoirs can be constructed without great expense, and the cost to the settler reduced by covering a larger total acreage.

That the time will soon come when irrigated lands in this valley will be worth \$300 an acre is among the certainties.

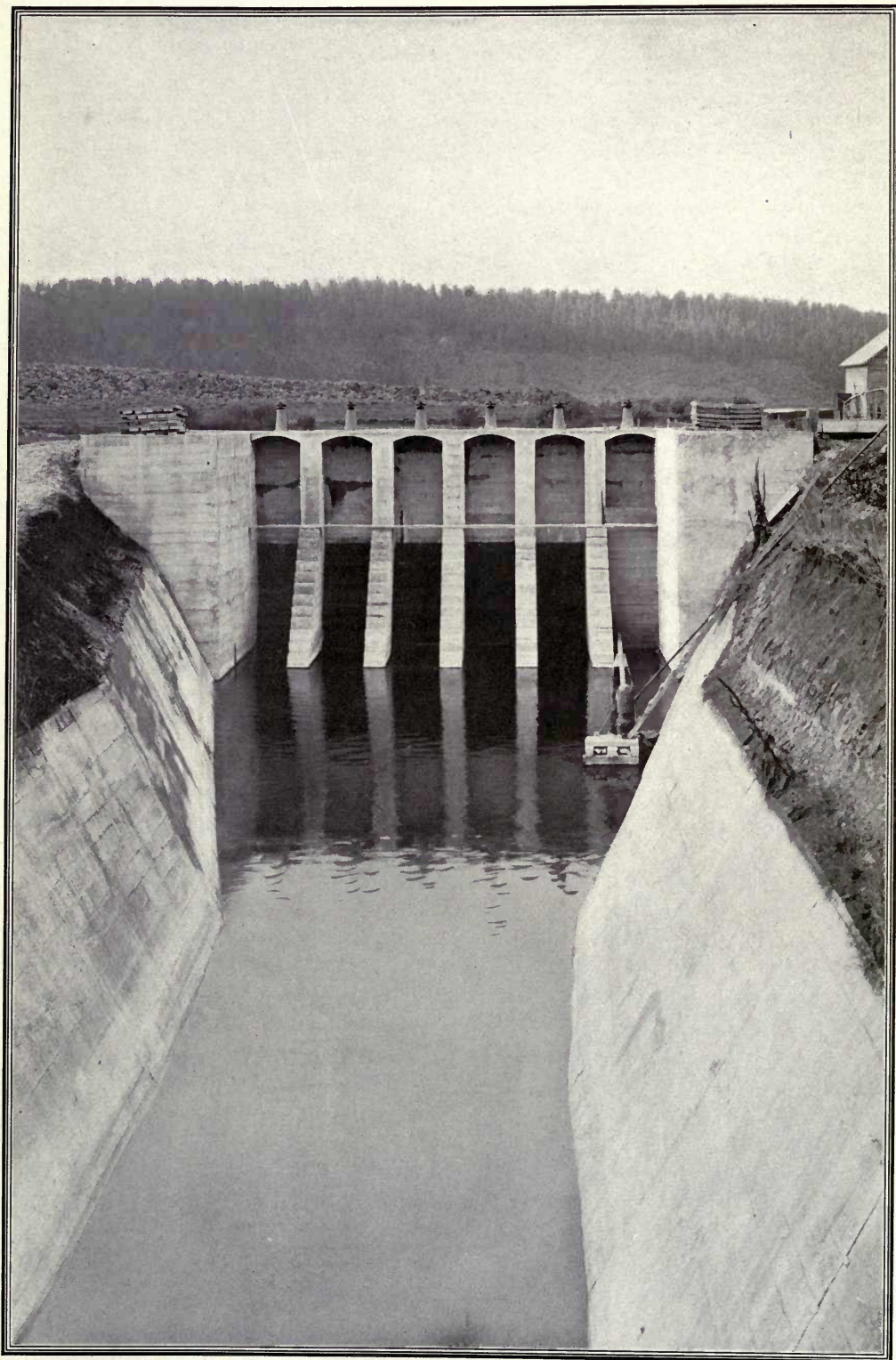
POPULATION AND MARKETS

There is a growing movement into this valley. Private irrigating companies are at work developing water for large tracts of land aggregating several hundred thousand acres. Large sums are being expended to fit these lands for immediate occupancy, and this in view of the present prospective demand. There will be here many times the present population. This will create values, and stimulate the growth of towns and cities.

Transportation facilities are good. The Southern Pacific occupies both sides of the valley and operates various branch lines; the Western Pacific reaches Oroville, half way up the valley, and then turns eastward across the mountains; there is an expanding system of inter-urban electric lines, and boats run on the river almost to the head of the valley. San Francisco is 166 miles distant, and Sacramento 100 miles, the region between being full of growing towns that feel the stimulus of the development from irrigation, from the subdivision of great ranches, and the multiplication of farms, schools and homes. This provides an expanding market, here at home, while fruit products have all the East and the Northwest, to say nothing of the cities of Europe which show an increasing demand for many kinds of fruit.

The most important feature of Western progress for the years just ahead of us will be the settlement of the Sacramento Valley, and the Orland Project is sure to be the center of a great farming community. Water is abundant, the climate is delightful, and the soil is of the highest type adapted to a wide range of products.

The great growth of Orland in the last year is proof of the wide interest in irrigation. Land owners under the Project have increased 100% and the size of land holdings under one ownership has decreased from an average of one hundred acres to forty-seven acres.



Head-gates on the north bank of the Link River, part of the Klamath Project.

The Klamath Project

Oregon-California

HERE Southeastern Oregon and Northeastern California are united by the Reclamation Service in a great irrigation system, which involves lake drainage as well as the irrigation of dry upland valleys, and is destined to create on the edge of the wilderness a large productive area. Long a stock-growing region on the margin of extensive forests, this is a promising field for the general farm, and opened now by the advent of railroads will develop rapidly. Details of the irrigation scheme and the methods of acquiring land are left out, and we are here concerned with the general situation, the setting of these lands, their producing capacity, and the outlook for population and agricultural growth.

AN INTER-MOUNTAIN BASIN

The Klamath Country takes its name from a series of mountain lakes on the borders of California and Oregon. On the north the mountains are heavily timbered, but in other directions the spurs and ridges have but scant arid growths of brush and shrubs with scattering pines.

The principal and central lakes in the basin are the Upper and Lower Klamath and Tule Lake, and the valleys are Klamath, Lost River, Poe, Yonna and Langells.

South of the interstate boundary line the low hills encroach upon the margin of Lower Klamath Lake and then open out into Butte Valley. This valley has perhaps 40,000 acres, and a prosperous settlement with several small towns has grown up. It is the nearest farm neighborhood having a large acreage, and the irrigable lands of the Klamath Project reach down nearly to the borders of Butte Valley.

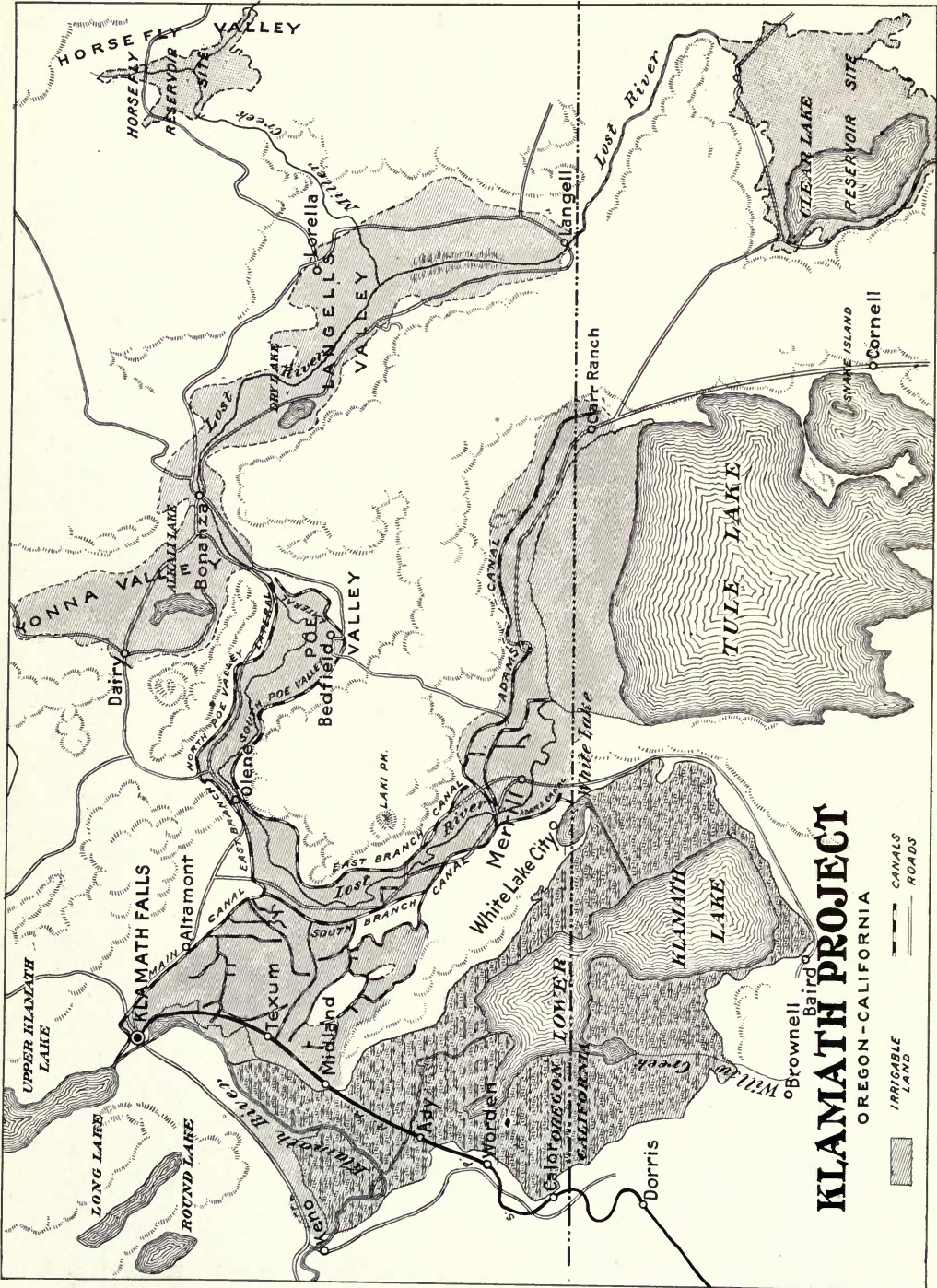
The two Klamath Lakes are joined by a short waterway one and one-quarter miles long, and having in that short distance a fall of sixty-three feet, showing the different level of the two lakes. They are drained by Klamath River, which flows into the ocean, and they are fed by numerous large springs and by two small rivers.

Tule Lake has no outlet. East of it lies a small lake named Clear, which gives rise to Lost River. This winding stream, starting in California passes into Oregon, wanders through all the upper tier of valleys, and coming back to within a few miles of its starting point falls into Tule Lake on the California side. The source of the river will be cut off and Tule Lake drained and reclaimed.

The average elevation of the Klamath Basin is 4100 feet, or a little lower than the Salt Lake Valley in Utah. The whole area to be reclaimed embraces about 180,000 acres, 50,000 of which are of the marsh type and the remainder volcanic or basaltic.

THE CLIMATE

The climate has two relations, one to the farmer's health, another to his crops. It is worth while to study them both. Do not be misled by the terms "basin," "marsh lands" and "drainage." This is a mountain basin in which the drainage is naturally good, and where the valley lands are so high up in the free air that no miasms are afloat and chills and fevers are not in the experience of the oldest settlers. It is not only a high air but a dry air.



Map of the Klamath Project, showing irrigable lands in shaded section.

The annual precipitation averages but fourteen inches and falls chiefly during the winter months. Snow falls occasionally, though some winters are "open" and have but slight "flurries" of snow. The temperature has fallen to zero but a few times in the past fifteen years.

The summers are not hot and have uniformly cool nights. There are occasional late frosts in the spring, but a general absence of severe storms and high winds. The prevailing summer weather shows little variation, and is marked by an abundance of sunshine and by those atmospheric conditions which produce at once bountiful crops and good health. The air in general is dry and bracing, and full of the ozone of mountains and forests.

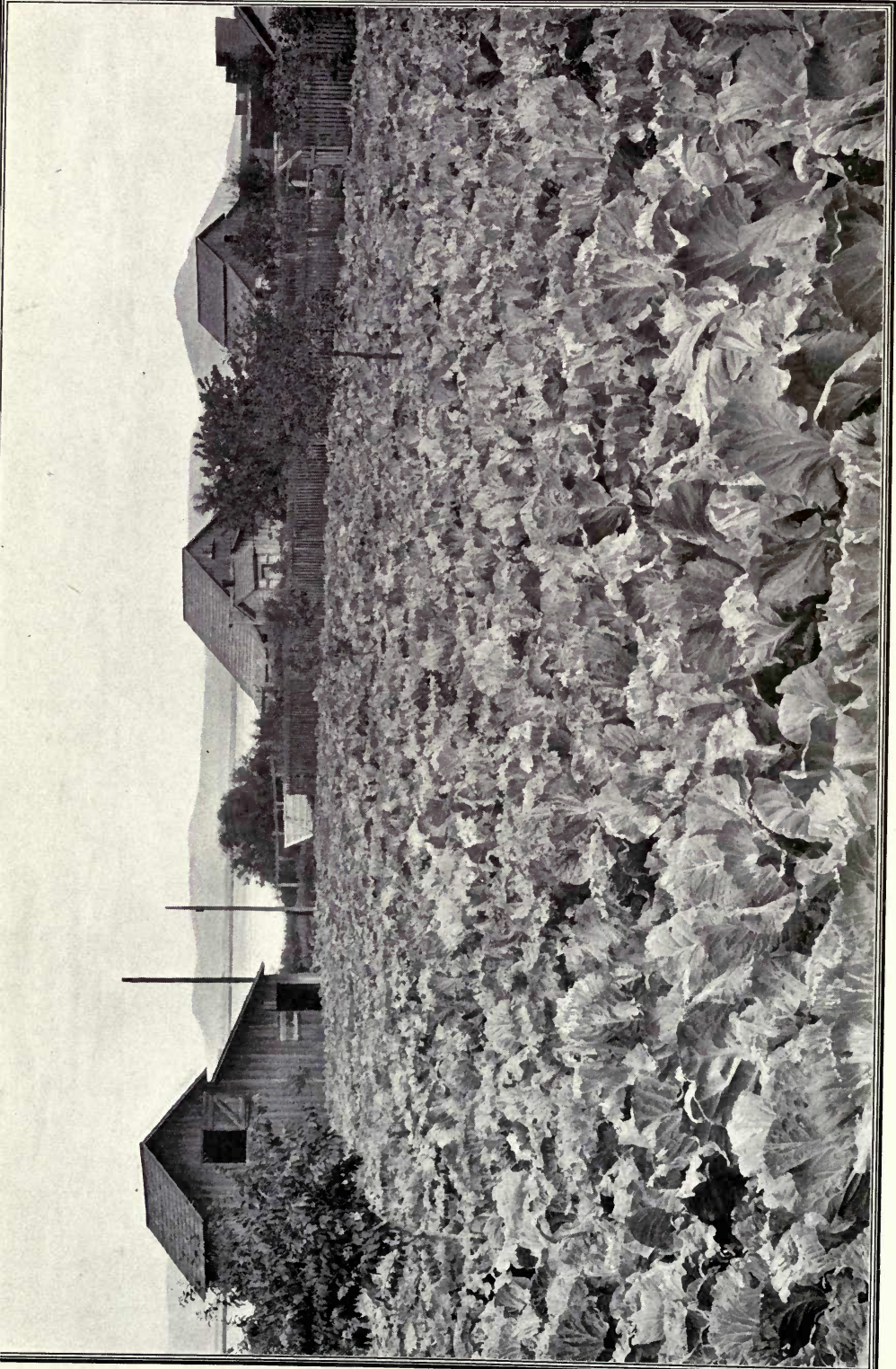
As the great bulk of farm products in this series of valleys will come from irrigated lands, the relation of climate to production is of consequence. Far removed from the sea, and with little cloudy weather, the growing season is long and favorable, and with water at command the question of production is not a difficult one. The countries in which irrigation is the great factor, are of course, the dry countries, where summers are warm and the air is dry. Here the seasons are mild, and the farmer is not likely to be buffeted by unfavorable weather. He finds a fairly uniform temperature, and with moisture when his crops need it, he can count with much certainty on his harvests.

CHARACTER OF THE SOIL

This is a lake district. It is surrounded on three sides by mountains. The wash from the higher areas has been going on for many centuries. The result is the shallowing of the lakes and the creation of much desirable land on the lake margins. The Upper Klamath Lake is surrounded by wooded mountains reaching to its shore line but its northern end has been filled in by erosion, and is now occupied by farms and a small town. The lower lake has receded until several thousand acres have been uncovered and are under cultivation. It is easily seen that the water surface of both lakes was formerly much more extensive than it is now. Nature's process of reclaiming waste lands by soil washed from the hills is going on here with considerable rapidity and will go on even more rapidly as the forests are cut away and erosion increases.

To this natural process is now added the direct work of the Reclamation engineers in the draining and reclaiming of marsh and tule lands in shutting off supplies from large lakes and providing for the drainage and uncovering of lake beds by evaporation. The result will be the recovery of large areas of the best lands in the world, the marshy margins and actual lake beds of the great basin.

These constitute the most distinct type of soil in the Klamath Country. It appeals at once to the farmer-instinct, and the man of the slightest experience in handling soil knows that this is immensely fertile and productive. These marsh lands are of the same general character as the marsh soils of the great Sacramento Valley, but have in them less river silt, since these soils are in the main lake sediments. They are lighter too in weight and color, having in them some volcanic matter and an unusual amount of vegetable material. They are well supplied with the elements of fertility and will respond rapidly to cultivation. Like all other soils of this character, these marsh lands will improve under cultivation, being less tractable the first year, and becoming more productive as they are stirred and exposed to the sun and air. The preparation of this land for cropping will not be heavy, as it will be fully reclaimed before settlement is



Cabbages at Klamath Falls. All table vegetables grow well here, potatoes being an important crop.

made. The experts of the Reclamation Service consider that the possibilities of this type of land, once under cultivation are obviously very great. The other soil in the area to be irrigated is called upland and belongs to the dry valleys at some distance from the lakes. These are largely sagebrush lands and are lava or basaltic soils. They belong to the class of soils found in the great wheat belt of Eastern Washington and Northern Idaho, and which in the Yakima Valley are today producing such excellent orchard and fruit crops. These soils have not only shown amazing fertility under most imperfect modes of cultivation, but give the greatest promise of continued fertility.

This is primarily a stock country, but the upland valleys of recent years have produced good crops of grain without irrigation. They are light in texture, easily worked, sufficiently deep for thorough cultivation and drainage, and have lain unoccupied or been roughly dry farmed, but have developed small villages, post offices and schools, and are surrounded by wide areas fit for ranging stock. Under irrigation these valleys will cut up into prosperous farms.

AGRICULTURAL POSSIBILITIES

We put it thus, because the Klamath lands have not been largely developed. There were some old canal systems in the basin and under the ditch, and by means of dry farming alfalfa and grain have been the principal crops. Alfalfa makes two good crops and generally a third partial crop. Where the cuttings are made, the land then is often pastured with stock cattle in large herds. This superb forage crop is staple, and aside from the common grains no special development of diversified farm crops has been attempted. It must be remembered that the region has been isolated, has been a stock country and that, until within a year, it was without a railroad. This explains why general farming has not developed, and why the opportunity for great growth is now at hand.

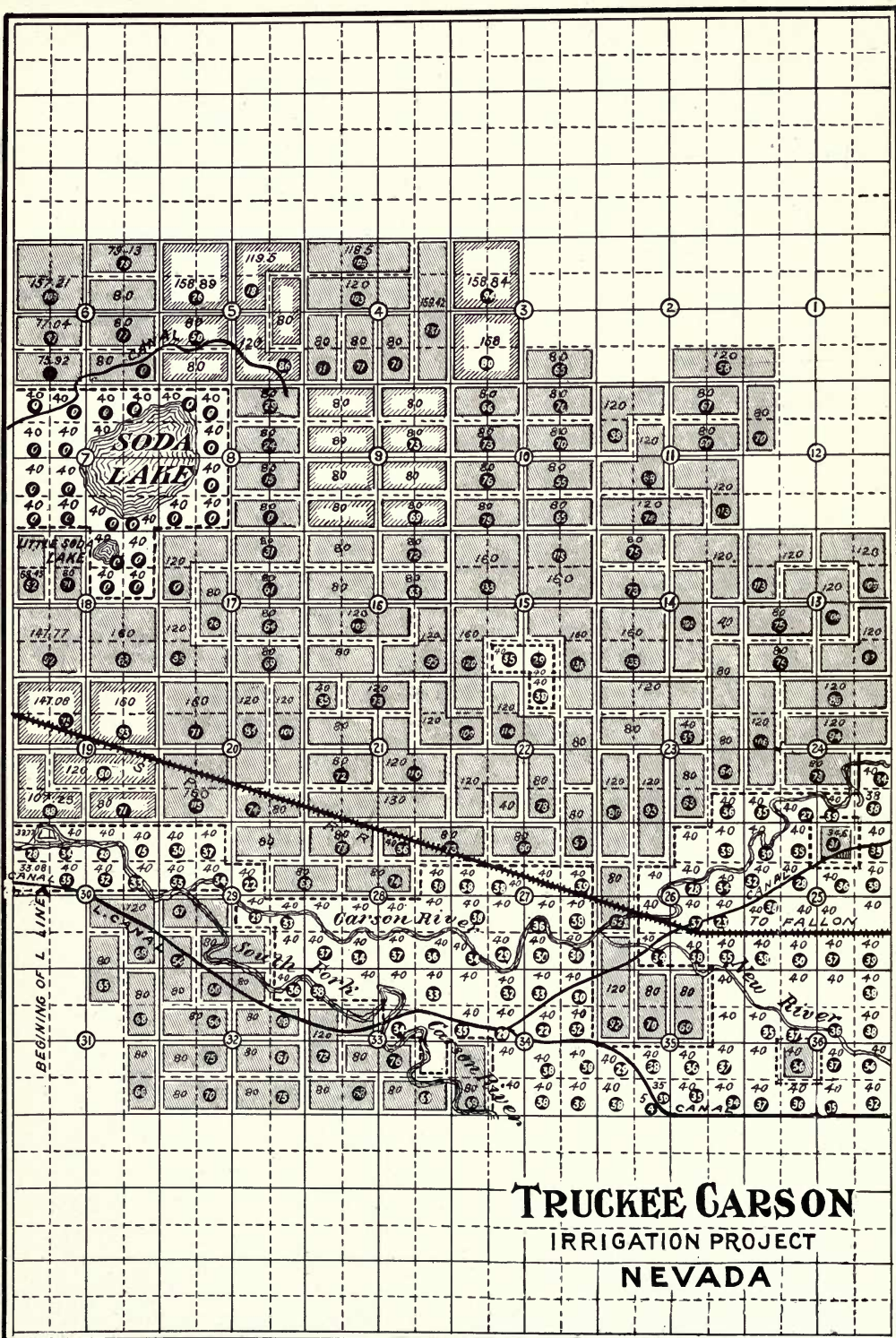
The possibilities of production are very great and the lands are suited to a wide variety of crops.

That this will continue to be a stock raising country, and become in addition a prosperous dairy country seems evident. Forage grasses grow here to perfection. Alfalfa and timothy are staple. The climate is not harsh. There are no extremes of heat and cold to interfere with growth and production. The range lands will welcome the farm crops for winter fattening, and there will be enough live stock to consume all the irrigated lands can produce.

Potatoes are becoming an important crop here, owing to their excellent quality. Cabbage, celery and root crops generally produce well; and in sheltered or protected areas the harder fruits will grow successfully. Apples will become a profitable crop if wisely planted.

OPPORTUNITIES

Klamath Falls is the commercial center of the project, having a population of 3,500. It is the present terminus of the Southern Pacific, which is building into Oregon by a new route, flanking the Siskiyou Mountains. The Nevada-California-Oregon Railroad is building in from Alturas on the east, and the Oregon Trunk Railroad is now building down the Des Chutes River, and will open this lake country to the Columbia River, Klamath Falls will thus become a shipping point of some importance. It will also become a manufacturing point. Great lumber interests find a natural center here,



Map of the Truckee-Carson Project—Irrigable lands shown in shaded sections—boundaries of farm units indicated by heavy lines, private lands by dotted lines, railroad land farm units by shaded border. Total acreage of each farm unit indicated by plain figures—figures in circles indicate irrigable acreage in units when less than total area.

and extensive mills will be erected. The certain growth of the town will mean new stores and shops, business chances of various kinds, and employment. Merrill is the second town in the district, twenty miles from Klamath Falls in the Tule Lake Valley. Bonanza is at the junction of Yonna and Langell's Valleys, and the irrigated lands have two town sites. Other towns are in the region, mostly small local centers of trade.

The lands in market are largely in private ownership, and the government land is not yet subject to entry, as it lies mostly within the area to be reclaimed by drainage.

The farm unit here is 160 acres, an unusual size in Government projects, and attractive to the general farmer.

There is at this writing, room for about 300 families and larger areas will soon be open to settlement. An Experiment Farm has been established, and a site for an upland farm is being leased, so that the settler will find aid in cultivating both types of soil, and will not have to conduct costly experiments. These Experiment Farms are for the benefit of the settler.

This project is full of promise, and the inquirer will do well to secure such additional information as the Reclamation Service can supply.

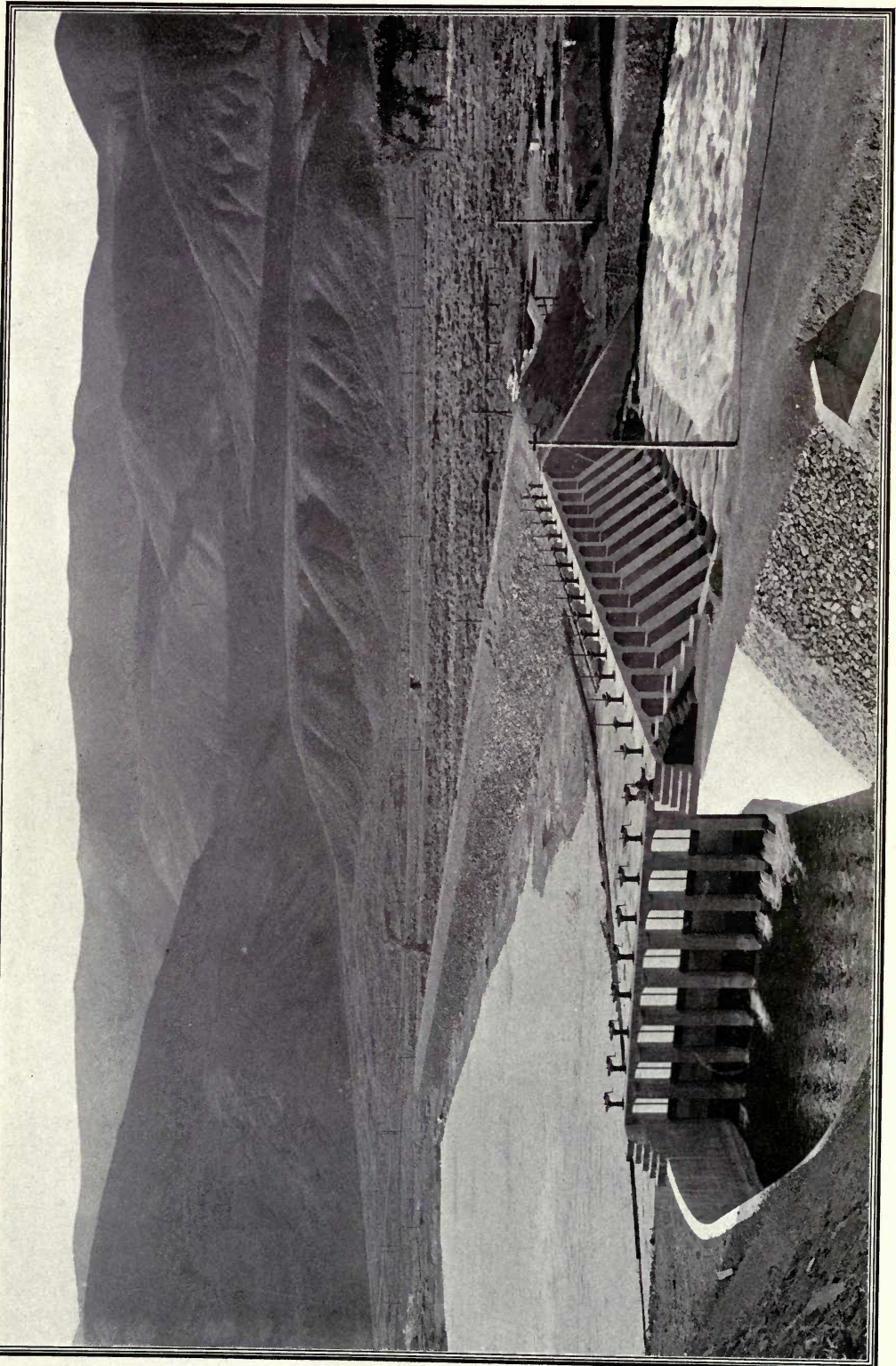
Truckee-Carson Project Nevada

THIS great project takes its name from the Carson and Truckee Rivers, which furnish the water. They rise in the Sierra Nevada Mountains and flow eastward into western Nevada, finding no outlet. The rivers lie in the drainage area of what is known as the Great Basin, and none of their waters reach the ocean. In order to utilize the waters of both rivers, and secure an ample supply for a large area of desirable land, the Truckee has been turned into the Carson by means of a large canal.

Both rivers have their rise on the eastern slope of the Sierra at an altitude of from 5,000 to 11,000 feet, and include a large forested area where the precipitation is mainly in the form of snow. The Little Truckee flows into Lake Tahoe, and the main Truckee issues from it on the northwest side. The Carson River Basin adjoins the Truckee on the southwest, and obtains its water mainly from the east slope of the Sierra. Both furnish natural reservoir sites, and the storage of surplus waters forms an essential part of the project. The total water supply exceeds 700,000 acre feet.

THE LAND AND ITS LOCATION

The tract reclaimed lies on the main overland line of the Southern Pacific, though out of sight of the railroad. The station is Hazen, and an alkali flat of considerable extent lies between the railroad and the irrigable lands. A short drive across this brings the visitor to the main body of reclaimed land. The chief town of the project is Fallon, to which a branch line of ten miles has been constructed. Fallon is the county-seat of Churchill County, but until the location of this project had a population of but twenty-five people. It has now upwards of 1,000 and promises to be a town of 2,500 in a few years.



The Truckee River Dam of the Truckee-Carson Project

The irrigable area of the first unit is 200,000 acres, of which about half is under the canal and 50,000 acres are open to settlement.

The elevation is 3,950 feet above sea level or 200 feet lower than Salt Lake City. The mountains, visible on three sides, are barren, but on the west sixty miles away are the forested and snowy heights of the Sierra Nevada.

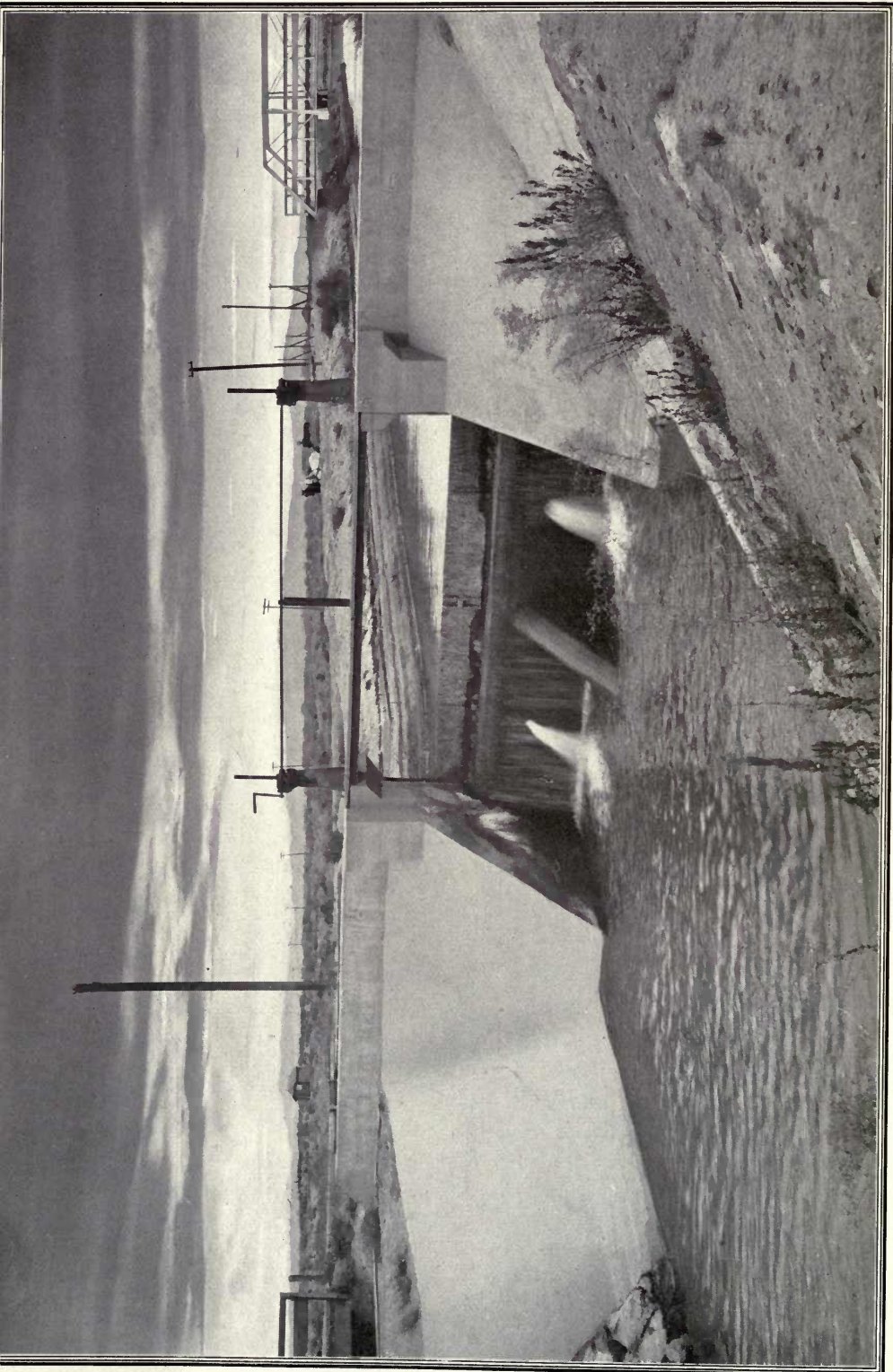
The locality chosen has long passed for desert, but it is in reality the bed of a prehistoric lake, and its soil is formed of river and lake deposits. The selection of an irrigation project is based first of all upon the soil, its quality and area. A scientific and chemical examination of the land is made at many points, and only lands of the best quality are made to bear the expense of water development. The soil here is of many varieties, sandy, loamy, clayey, adobe and black peat. On the upper benches are found a little gravel; otherwise the soils are not gravelly. They have the advantage of being virgin, and are shown by results to be highly productive. Experience shows also that the condition of this soil generally is improved by use for two or three years, becoming more productive. This the soil expert readily understands. It is due to "weathering" or the exposure of the soil particles to the sun and air. It is to be looked for in reclaimed marsh lands, in old lake beds, and in all places where water has stood, or the soil has been shut away from the air. All soils are improved by culture, and cannot be exhausted by right methods of cropping. It is part of the new agriculture to give attention to tillage, and to put new emphasis upon the meaning of the word agriculture, which signifies field culture, and the improvement of the soil by stirring. This is the first lesson which the settler learns on the Truckee-Carson lands. They are improved by cultivation, and will not do their level best the first year.

AGRICULTURAL NEVADA

You may raise the question whether Nevada is an agricultural state, so long has it been thought of as a desert, and valuable only for the minerals hidden in its hills. But any state is agricultural which has good soil and a favorable climate, and soil to which water can be applied in an arid region. This famous mining state has some very productive farm lands, and small areas have been under cultivation for half a century.

The returns from the Experiment Farm near Reno, and connected with the State University, show very satisfactory results, and the farms about Carson City, around the Truckee Meadows, and in the Lovelock Valley and elsewhere are as productive and profitable as the average farm lands in the Middle West. The very limitation of the irrigable lands in Nevada is an advantage to the resident farmer, insuring a home market for his farm products. Even were water plentiful, the lands that can be irrigated are limited, and the farmers of Nevada will never be crowded, or troubled by over production. Staple crops will always be in demand, and intelligent selection of locations will produce large orchard crops for which the mining towns constitute a ready market.

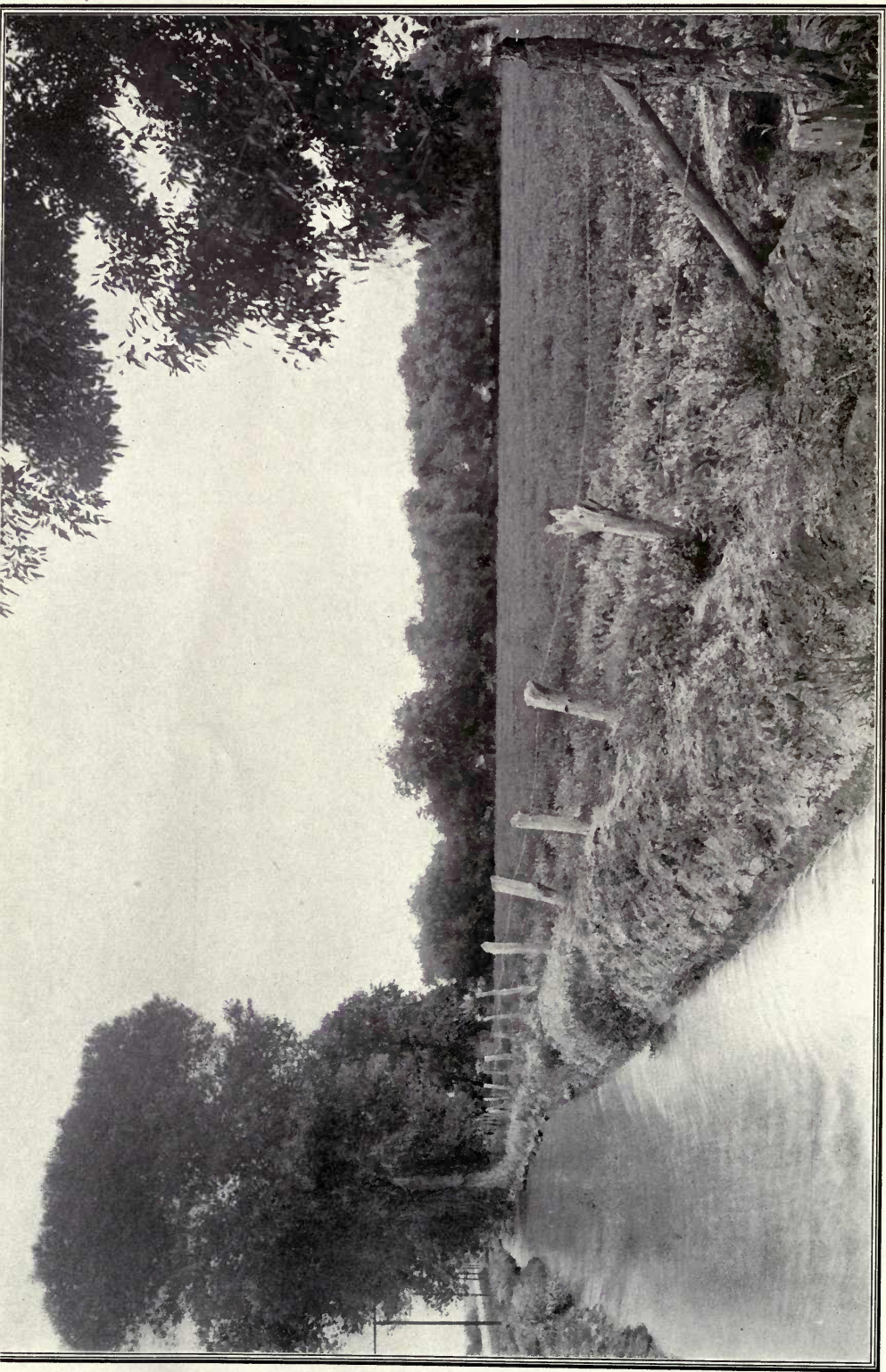
It is important to keep this in mind. The farmer's problem here is not production, but disposal of products. Mountain regions are proverbially prolific in all that is best in plant and animal life, and Nevada is no exception. If her lands are desert lands in appearance, they are rich in phosphates, and water makes an oasis, turning the desert into a garden. Farmers make the state. Always the enduring commonwealth is built around the farms. The wealth of Indiana, Ohio, Iowa, Illinois, is built upon their agriculture. It takes a rural population to make a city, to build



Head-gate drop on the Truckee-Carson Project.

GOVERNMENT IRRIGATION—SOUTHERN PACIFIC





Alfalfa under irrigation near Phoenix, Arizona. Here, as elsewhere in the West, the great forage crop.

railroads and trolley lines, and there is no country on earth where men can find fruitful soil and a congenial climate, where good honest farming will not make a successful and prosperous state.

There is nothing like farming. When you take minerals out of the ground you leave a hole; but when you take agricultural products out of the ground you can take just as much next year and every year. That nation that is founded upon its cultivation of the soil is the greatest nation; and no nation ever continued to exist which did not conserve its soil.

In the case of Nevada, her mineral wealth will long engage the attention of the miner, and mines that fail in one place will be succeeded by others in other localities, these mountain ranges being seamed by veins of ore, but her farms once developed are abiding. Their products are in no sense competitive with those of the other states. Statistics show that nearly eighty per cent of the desert crops are forage and consumed at home. Here the demand for home-grown crops is at the door and assures the farmers prosperity. The cultivated acreage, as we have said, cannot be greatly increased while the irrigated lands will develop towns, the ranges will continue to grow stock and to require alfalfa and grain for winter feeding, and the established mining districts will need all kinds of farm products.

The population of Nevada is now about 100,000 as compared with 40,000 in 1900.

Growth is going on rapidly, and it will be a long time before the farmers can supply the needs of the state.

CLIMATIC CONDITIONS

These touch the agricultural side very closely, though the farmer often ignores them. Right temperature has a close relation to crop production.

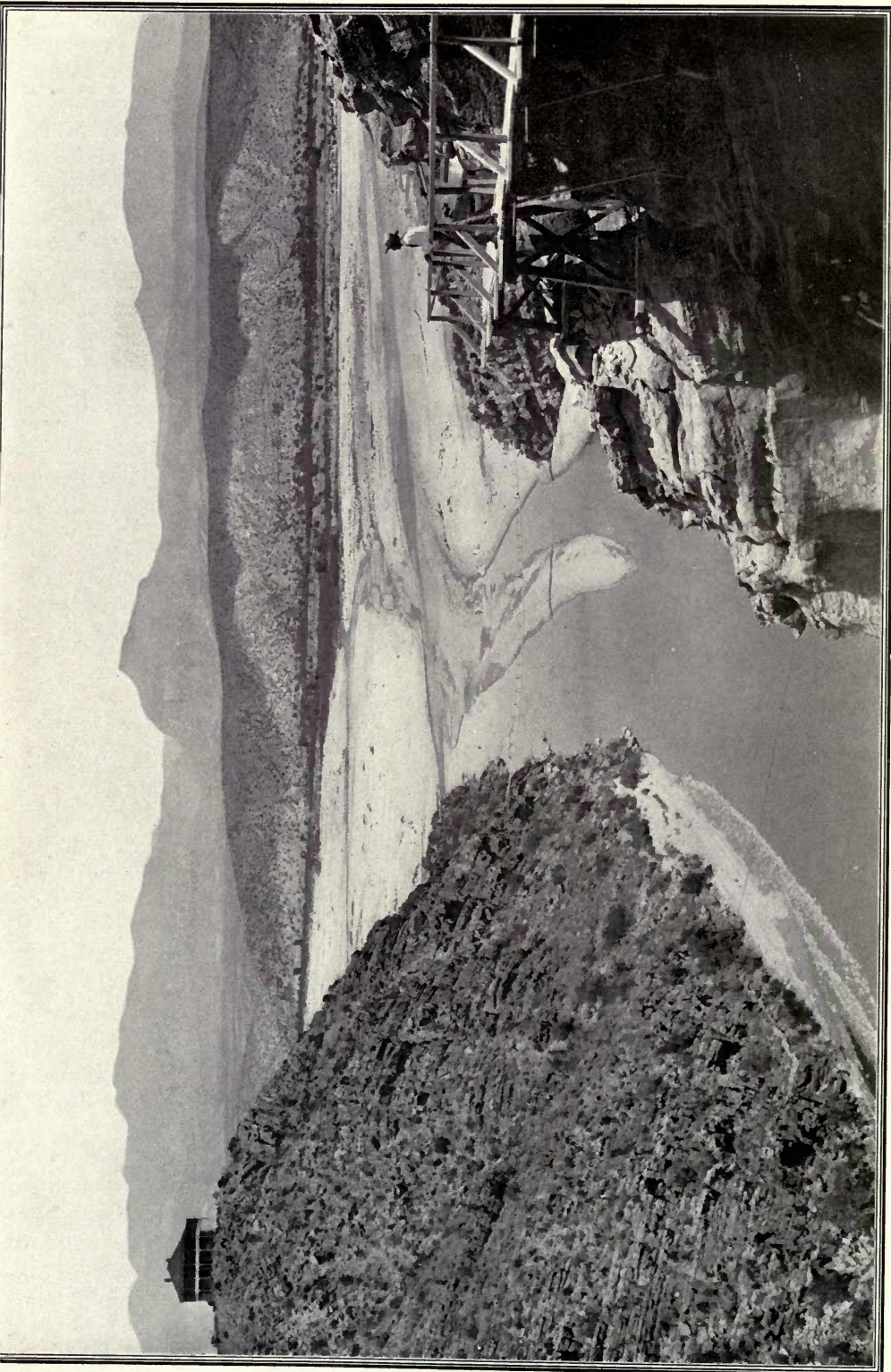
The Nevada Basin is part of an elevated plateau extending far eastward, and it is one of the driest regions of the West. The rainfall ranges from two to five inches in the year, and there is practically no rainy season. Snow falls occasionally—snow squalls rather than storms. This means an inch or two of snow at a time, which seldom lies more than two or three successive days. The summers are warm and dry. The thermometer may go to 100 now and then, but the sensible temperature is only about seventy degrees, owing to the dryness of the air, which produces rapid evaporation, leaving the skin with an agreeable sense of coolness.

A feature of the region is the large number of cloudless days, probably 300 in the year. The sun shines some portion of nearly every day. This produces evaporation from leaf surfaces, promotes circulation and makes plant growth rapid. There are few storms, no cyclones, and high winds are not common.

As compared with the Middle West, the Northwest, or New England, the winters are very mild. By the first of March the alfalfa is starting, and by May first it is a foot and a half high. After May first all tender garden vegetables can be planted with safety.

There are few regions of the world where general health conditions are better than in this part of Nevada. Pulmonary troubles are not generated, asthma seems to cease at once the air is breathed, and many ills of the Mississippi Valley and other rainy regions are unheard of. The clear skies, the altitude, the dryness and even temperature favor good health, and these conditions are a specific for malaria.

Water for domestic use is secured from wells at from twenty to forty feet and is good.



Junction of the Salt and Tout's Rivers at Roosevelt, Arizona, close to the big dam.

FARM PRODUCTS

The great forage crop of Nevada as elsewhere is alfalfa. The absence of organic matter in the soil makes this crop a very important one to begin with. It leaves organic matter among the soil grains and once in alfalfa a year, any crop can be produced which can be grown in the Middle West. Alfalfa yields from five to seven tons per acre and sells from \$8 to \$10. per ton in the stack.

In other crops the yield averages higher than in states farther east, even higher than in the Mississippi Valley, and the quality is superior. This is due to the unleached soils of this valley and to the dry air and abundant sunshine. Wheat will average thirty—perhaps thirty-five bushels to the acre.

The Experiment Farm connected with the University has produced sixty-seven bushels to the acre and if this shows exceptional care and skill it also shows that better methods on the farm will increase the average yield.

Wheat, barley, oats, rye, potatoes, onions, all vegetables, are grown easily and yield abundantly. Corn is not grown extensively, owing to the cool nights of summer, but the Experiment Station thinks it may be grown as a silage crop and for dairy feeding. It is probably a matter of better farming and of seed corn adapted to the locality. The Station is working for an early developing variety. For hogs the dependence is alfalfa, with barley, but careful farming will produce corn for hardening pork for market.

From the nature of much of the soil, potatoes do exceptionally well and are shipped to California and even to the Hawaiian Islands.

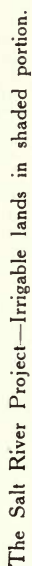
Stock raising is a large industry in Nevada, but pasturage on the ranges fluctuates, and more and more as lands come under irrigation the alfalfa field will become the chief reliance of the stock grower. The tendency of the business is toward cutting and feeding, rather than pasturing, and farms will be devoted to stock, producing raw material to be turned into food for the market.

As these lands settle up the full adaptation of Nevada soil and climate for the production of the sugar beet will be recognized, and a sugar factory is now being built, experiments having shown that this is an ideal section for beet production.

Fruit has not been largely planted in Nevada, other interests engaging attention. Apples grown here are remarkable for their quality. They have fine color and size, superior flavor and good keeping qualities. Wisdom in selecting location for an orchard, and in choosing varieties will develop a profitable industry, the market being at the door. Many kinds of deciduous fruits do well, but more care than usual must be shown in selecting right exposures and as near frostless conditions as the situation will permit. But aside from the commercial production of fruit each farmer may have several kinds grown about house and barn and a garden of berries as well as vegetables.

FARMS AND LAND VALUES

The farm "unit" varies from forty to one hundred and sixty acres, but the average size of the farm is eighty acres. The idea is to give each entry man eighty acres of good irrigable land. A home may be secured on this project by filing on a homestead under the Reclamation Law, by purchase from private land owners, or by purchase of Central Pacific Railroad lands. The publications of the Reclamation Service make plain all the conditions. There is a United States Commissioner at Fallon, on the project,



and a Land Office at Carson City. Land with a vested water right, and under cultivation may cost from \$30 to \$75 per acre, and railroad land adjoining right of way and reaching back three or four miles may be bought for an average of \$5 per acre. The farmer who can come to these irrigated lands with sufficient capital should not economize by buying cheap lands. The cheapest land often costs too much. The primary value of land is in its productiveness as expressed in dollars, in health, in comfort, in social and market conveniences and agreeable surroundings.

SOME CONTINGENCIES AND ADVANTAGES

There are here now about 500 families and several small towns, a main line of the Southern Pacific Railroad and two branch lines, while the Western Pacific, also an overland or trans-continental route, is near by. The town of Fallon is connected by rail with the main overland route, and the great mining centers of Southern Nevada, Goldfield and Tonopah are reached by a line running south. This also connects with Carson City and Virginia City.

As settlement progresses, tree planting will add to the beauty and comfort of the region, modifying the climate and relieving the monotony of the landscape. Green fields and orchards make the region homelike.

The low price of good land, its productiveness under irrigation, the adequate transportation at hand, the home market for all products, the terms upon which water rights are secured, and the permanent character of the irrigation works, are all to be reckoned as advantages in developing a self-supporting home.

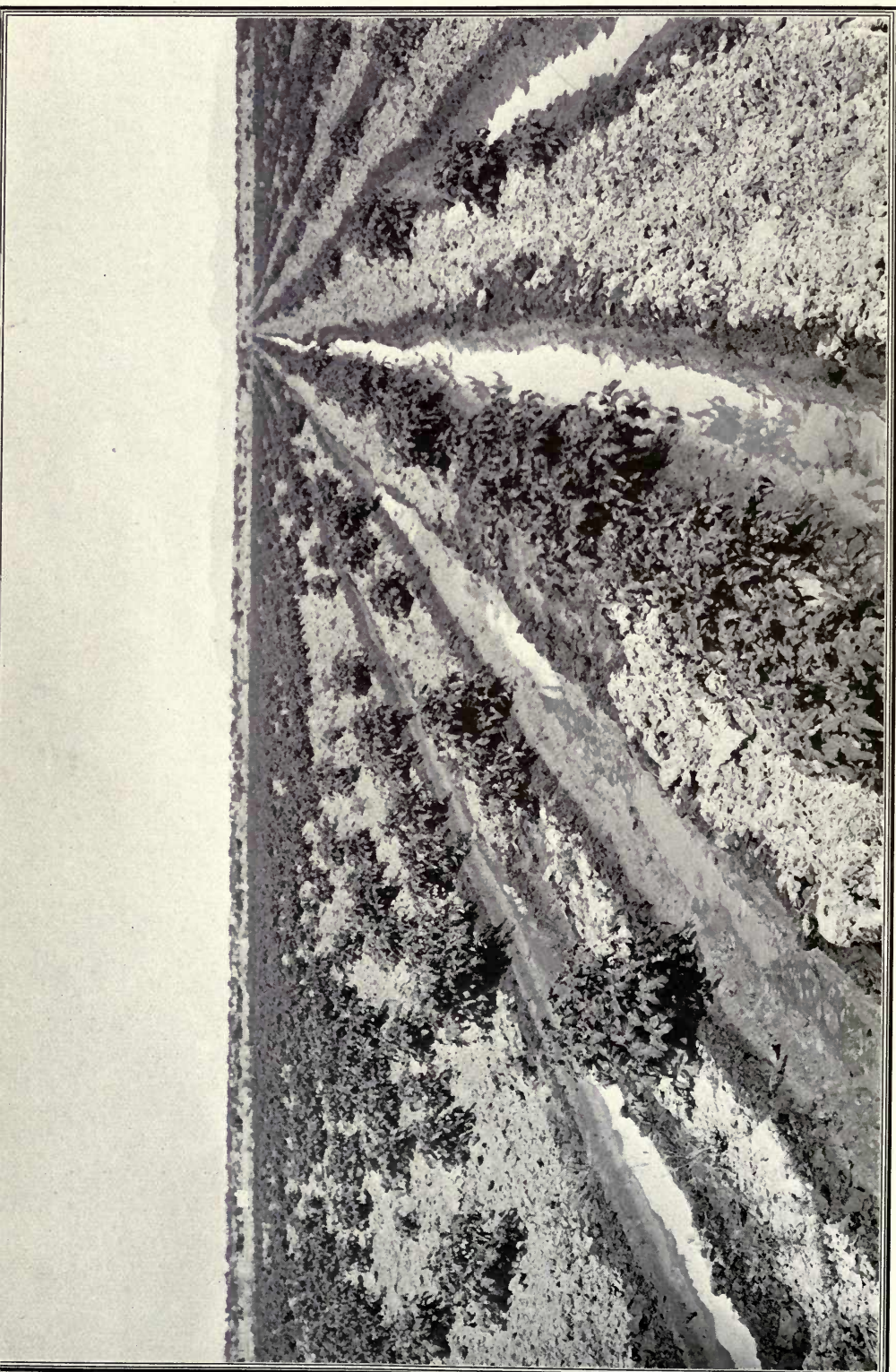
The Experiment Farm of 160 acres will be an object lesson under the Department of Agriculture, and direction and help will be freely given the settler who may need advice about methods of irrigation or special crop production. This will often prove to be invaluable.

There are banking conveniences, good school facilities, and established churches, so that the advantages of a pioneer belong to the settler without the pioneer's privations.

Salt River Project Arizona

THE largest body of irrigable land in Arizona, and the most highly developed, is in the Salt River Valley. This is in Southern Arizona, a region quite distinct in topography and climate from the northern part of the territory. About midway of the territory there is an abrupt descent of about 3000 feet, and a change in the nature and aspects of the country.

In the heart of this lower region lies the Salt River Valley, about thirty-five miles long by from twelve to twenty miles wide, and its 350,000 acres are almost one continuous body of fertile land. In fact it is broken only by the Salt River, which flows through its northern portion and the Gila River farther south, below the Salt River Mountains, so little waste land is in all this area.



Tomatoes on the Blaisdell ranch at Yuma. It is only a short while since sagebrush grew on this spot.

LOCATION AND CHARACTER

Phoenix, the capital of the territory, is in the Salt River Valley, and is reached by a branch line of the Southern Pacific thirty-five miles from Maricopa on the main overland route. The Santa Fe also comes into Phoenix, diverging from its main line at Ash Fork, 190 miles north.

The valley slopes gently to the south and west, the lay of the land facilitating irrigation and drainage, but the appearance is that of a flat plain. So level and smooth is the surface of the desert or unoccupied lands, as to suggest that it had long ago been leveled and tilled. In fact, the remains of old canals are traceable, so skilfully run that they serve the engineer of today, and the remains of old houses of great dimensions and several stories in height are here. Evidently a prehistoric race lived here, tilled these fields and gathered their harvests, leaving behind little trace of their existence save the evidence that they were farmers and irrigators.

The valley has been under modern cultivation for years, but the uncertainty of the water supply, and the final destruction of the dam by floods, interrupted the prosperity that was at hand, and left much land to revert to the desert. The great cost of supplying water led the Government to build the great Roosevelt Dam and to provide a permanent system covering 240,000 acres. This has made the fair valley again a real oasis in the desert, as fertile as it is beautiful. It is a farmer's land in appearance and in reality. The settlement of the valley began in 1868, and the test of soil and climate in the matter of production, and in the range and variety of crops has been ample and satisfactory.

THE WORTH OF THESE LANDS

There are several grades or types of soil, adapted to a wide variety of crops. These are gravelly and sandy loams, Maricopa loam and Glendale loess. Maricopa loam is a heavier grade of the sandy loam, and Glendale loess is the finest silt mixed with fine sand. This is a valuable soil showing much lime, potash and phosphoric acid.

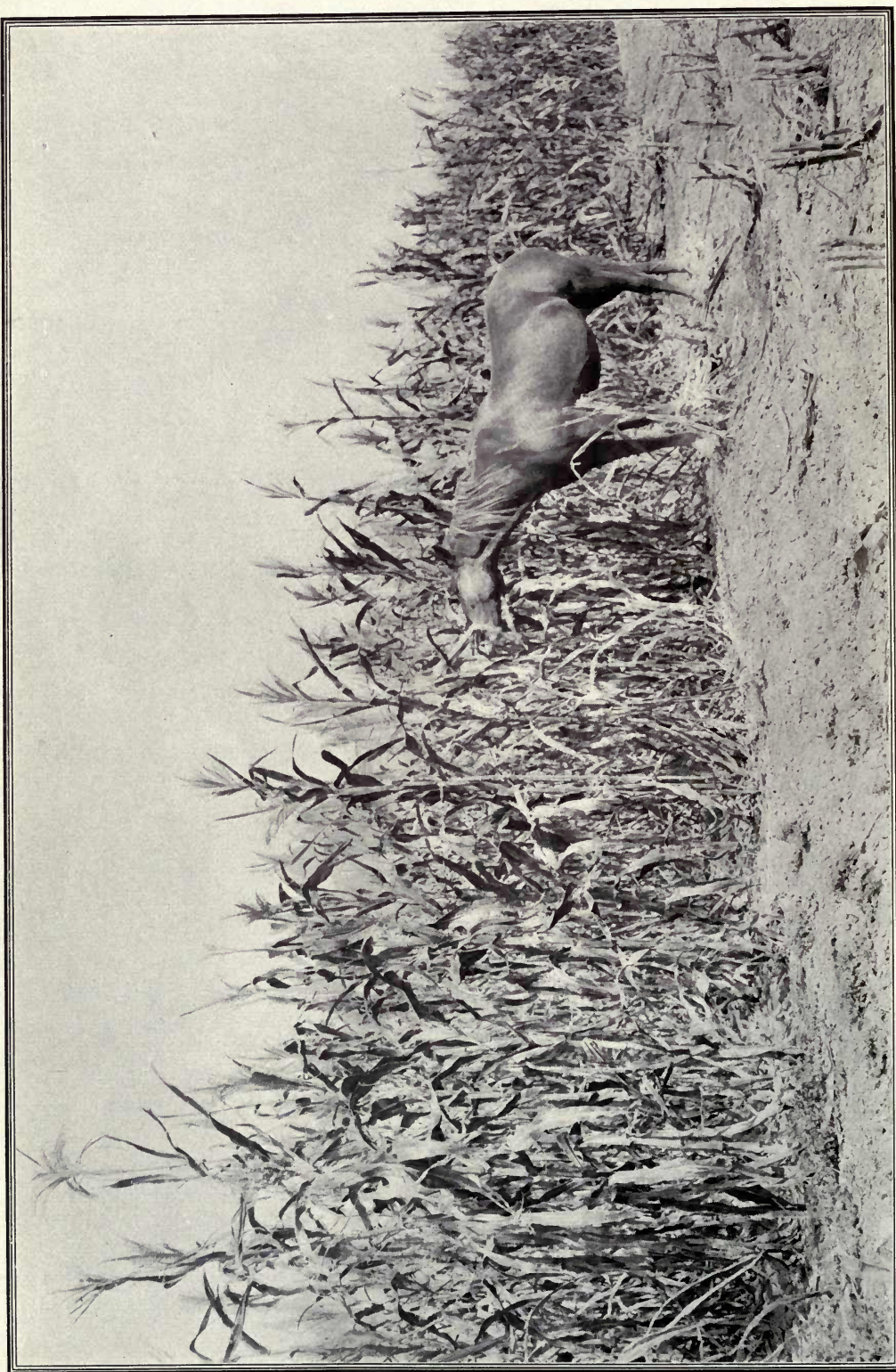
The observing visitor is struck by the evident depth of the soil plane. The bases of the mountains are submerged, the valley being surrounded by mountain tops. Here plainly were frightful canyons, and the tide of silt and soil particles flowing into them for untold ages has built up the level until the plain seems at flood. Borings have shown this to be true, depths 100 feet, 500 feet and 1300 feet have been reached without finding bedrock.

Now this is the farmer's first concern—good soil, deep soil, soil that will not wash away, and that will lend itself to cereals or fruit, alfalfa or oranges.

As usual in desert soils the percent of nitrogen is low, but the wise farmer knows that this will be supplied by right methods of farming, and especially by growing alfalfa. What we have said elsewhere in these pages about the fertility of arid soils can be emphasized. These valley lands are immensely rich because their chemical salts—their plant food—has not been leached out by ages of rainfall.

There can be here no soil erosion—no washing away of farms in 10,000 little gullies, and no exhaustion of fertility by cropping, since the waters which made the valley still carry into it the elements out of which crops are grown, and these are distributed every time the farmer irrigates the land. The fact is well known and explains why the soils of Egypt, of India and of China, cropped for ages, are not worn out, nor depreciated.

GOVERNMENT IRRIGATION—SOUTHERN PACIFIC



A cornfield at Yuma. The horse gives a good comparison of the height of the crop.

In view of the abandoned farms in the East, and the greater number which have declined in productive power, it must be a great satisfaction to a farmer to settle here and feel not only that his farm will stay by him, but that he can pass it on to his children unimpaired in fertility.

BUT THE CLIMATE!

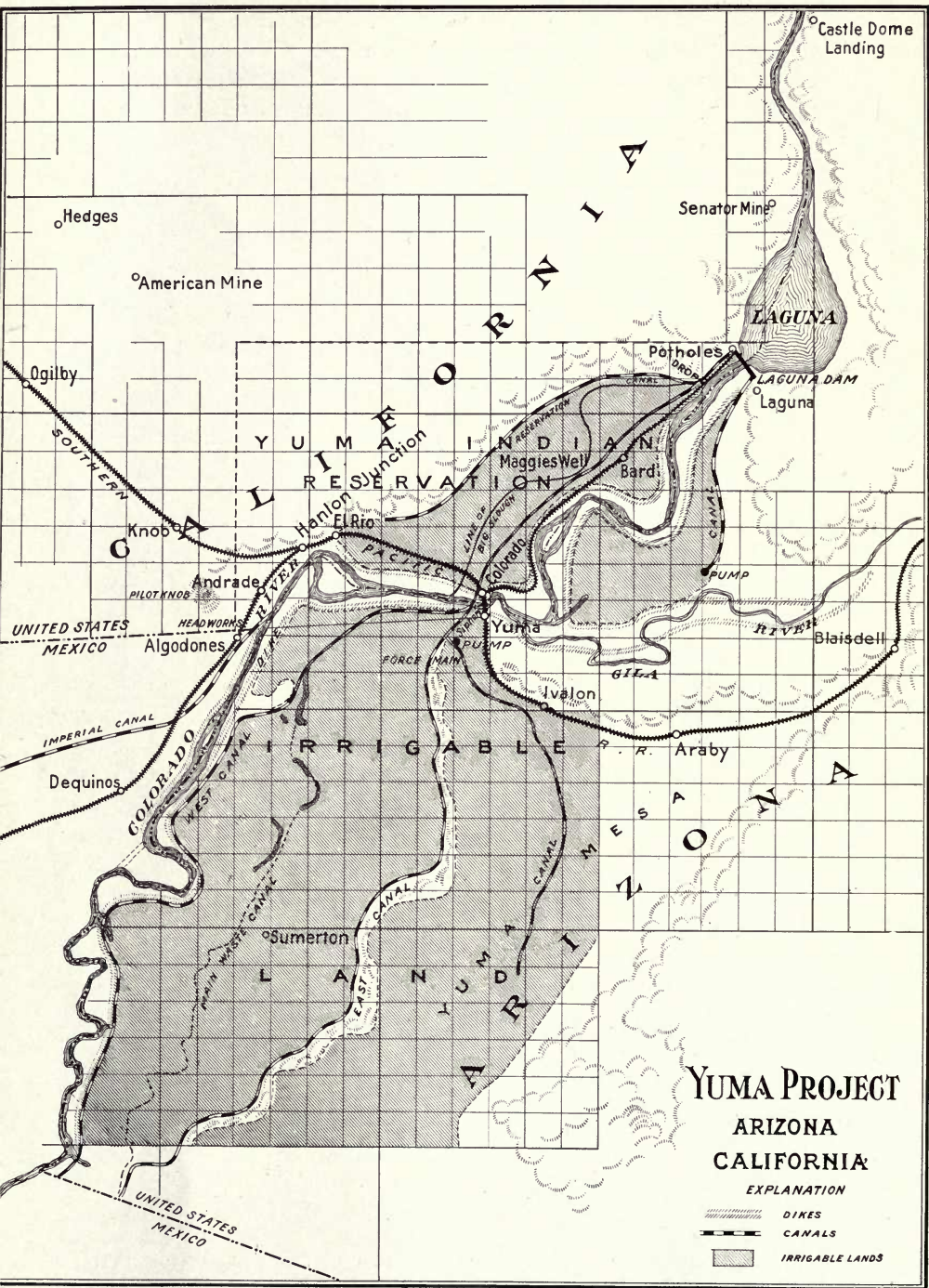
Since life for most of us is a struggle, if we are to farm at all let us farm where the climate will help and not hinder—where it will constantly aid in solving the problem of production. If one is to live by the soil, he wants the best, and wants it in the best climate. Comfort is of consequence, but the farmer who goes to Canada for cheap land does not reckon with the climate. He wants land and a good deal of it. The farmer who comes into the Southwest is wiser if he reckons climate at its cash value. He knows that it is not first a question of comfort, but of profit—of production, and though the summer be hot, there is a good deal of satisfaction in a bumper crop every year. Here one does not say, "This is good growing weather." It is good growing weather for ten months in the year, and then while stock elsewhere are in bank barns, here they are in green alfalfa fields in midwinter. This is climate. The man who grows things wants warmth, sunshine, equable temperature and the right temperature for a long period. He can only farm in a disappointing way against climate. It is a mistake to have to "buck" against the weather.

Climate has its relation to the grower as well as to the crop, and if Southern Arizona is hot at times, it is a land of health. It invites to life in the open, and that means vigor. The man who lives in the outdoors and is sensible in his habits and his diet, has little need of the doctors. These dry lands are the lands of health. Here are no malarias, no germ diseases, no anemic troubles, no "muggy" and depressing days. There is no "scale" in the orchard, no fungus growth. Tree and plant, man and animal are healthy, develop rapidly and are vigorous and fruitful. This more than balances conditions and one hears no complaints about hot summers where alfalfa matures a crop every forty days, and oranges store up sweetness and fineness in the sunshine, so that they command a premium in all markets. Salt River Valley winters are full of sunshine, and the temperature rarely falls below thirty-six degrees, ranging between that and seventy-five degrees. The fields are green and alive with stock which has come in from the northern ranges and is fattening on alfalfa pasture. The percentage of sunny days is large, the winter sometimes showing less than a week of days when the sun does not shine brilliantly during some portion of the day. The actual number of rainy days is small, but showers may occur at almost any season. The nights are cool.

FARM PRODUCTS

This valley is one of the beautiful and productive gardens of the Southwest, and the basis of prosperity is the substantial one of stock and alfalfa. The fields produce from six to eight tons at an average of \$12 per ton. Its feeding value is not less than \$8 to the grower. The demand for winter pasture is extensive, and from 20,000 to 40,000 head of cattle come in here every season to be fitted for market on the alfalfa fields. Sheep, too, are driven in from the colder ranges by the hundred thousand and are kept over "lambing time." Many hogs are also grown on alfalfa, and the spectacle of droves and herds of stock in lush pastures in midwinter is a hint of prosperity which the dullest can take.

GOVERNMENT IRRIGATION—SOUTHERN PACIFIC



Map of the Yuma Project, showing irrigable land in shaded sections.

it in the desert 16,000 acres of good land, with a good independent water supply and is thirty miles west of Phoenix, with the certainty of a railroad soon.

There will be the development of great electrical power below the great dam, and the sale of this will reduce the cost of water rights, besides developing manufacturing. In every way the outlook is good, and the settler will not be disappointed who comes here with means enough or energy enough to get a land holding of his own.

The Booklet offered by the Reclamation Service warrants all we have said about the region, our convictions being the growth of much independent study on the lands themselves at different times.

Ex-President Roosevelt says that civilization rests at the bottom on the wholesomeness, the attractiveness and completeness, as well as the prosperity of life in the country, and there is here the making of a substantial community as attractive, as varied in its farm industries, and as prosperous as can be found in any state in the Union. The community is here, growth is well begun, there is a market for all products, there is going on the development of great natural resources, and there will be great advances in property values. It is up to you to say whether you will share in these conditions and profit by the growth that is coming.

The Yuma Project Arizona

THIS well-known town of Yuma is on the Sunset Route of the Southern Pacific where it crosses the Colorado River and the California-Arizona line. It is familiar to the overland traveler, and excites his interest partly because of its picturesque location, its Indians, seven hundred Yumas have now put aside their war paint and weapons and are here cultivating the arts of peace; and partly because he wonders at the courage which undertakes to build homes and a town in the midst of this desert stretching far on each side of the river.

But no wise man judges from appearances. No intelligent farmer estimates the worth of a country from the car windows. A simple statement of the situation here will show strong grounds for confidence in the future of the region, and justify the courage which has struggled here to wrest farms from the summer floods of the river and to provide moisture for lands which the river made, but no longer overflows.

THE LOCATION

Yuma is on the eastern bank of the Colorado River, about eighty miles above its mouth and nine miles from the international boundary line between Mexico and the United States. It is the chief point in a large district, and headquarters for the mining camps of the country, some of which have been constant producers for many years.

There is an important Indian school here, transformed from Fort Yuma to present nobler purposes.

It is the center of an agricultural district embracing considerable territory and so important is the soil area and the soil quality as to secure the attention of the Reclamation

GOVERNMENT IRRIGATION—SOUTHERN PACIFIC



Alfalfa in Yuma, cut three months after seeding, capable of being harvested eight times yearly at a yield of ten tons to the acre.

Service and the expenditure of large sums in building a dam in the turbulent river, carrying a huge inverted syphon under the river and constructing canals and levees to water and protect the lands.

The town is distant from Los Angeles 250 miles; is still farther by rail from San Diego; Tucson is 250 miles to the southeast and Phoenix 200 miles eastward. There is thus room for a city of commercial importance, and when we have pointed out the extent of its tributary lands, the character of its soil and possibilities which its climate offers for the production of high-class crops, we will have indicated the reasons for belief in Yuma's future growth in population and in commercial influence.

THE RIVER AND THE SOIL

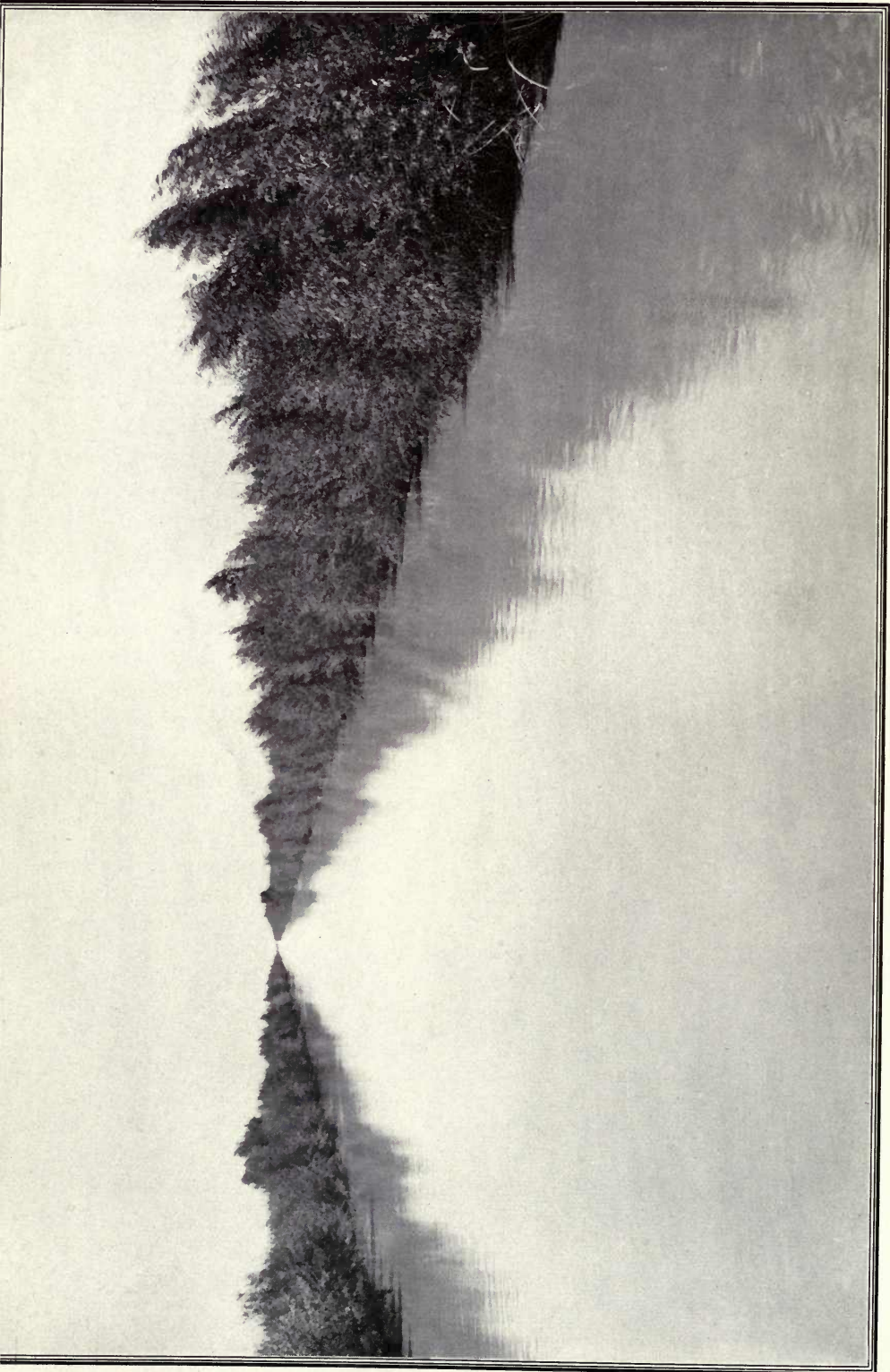
The Colorado is the great factor here. It is the Nile of this region, and will make it as the historic Nile made Egypt. It has made the land, and will forever fertilize it. Along these lower courses of the great stream has been formed a narrow strip of fertile soil in the midst of desert conditions, and as the annual summer overflow is rich in fertilizing sediments, it has kept up a sort of a perpetual "top dressing" until now. The result is a body of land equal in fertility to that of Egypt, but of less extent, in a climate like Egypt's.

Irrigation now takes the place of the summer overflow, but the fertilizing elements held in suspension by the stream are carried in the water of the canals and left upon the land. The problem indeed of the engineers has been to prevent the Colorado silt from choking the canals and covering the young crops as with a blanket, but this has been solved by "settling basins," while it is certain that enough remains in the irrigating waters to maintain the productiveness of the land unimpaired under the most severe cropping. "It is believed," says an early report of one of the engineers, now the Director of the Reclamation Service, "it is believed that the plant food carried by the silt in solution in the river water will perpetually fertilize the land." This is a modest statement, and well within the truth. Investigation by the University of Arizona demonstrated that four average acre feet of Colorado River water at Yuma carried sediment enough to make a layer of soil about one-quarter of an inch thick. On basing their computation upon the use of three acre feet of this water they found that the fertilizing value of this material, if bought in the market, would be about \$9.00 per acre. Where such conditions prevail cultivation can never impoverish, but actually enriches the soil. "The knowledge," Professor R. H. Forbes of the University, says, "is as old as human history, that river irrigating sediments increase the productiveness of the land," and they found 4.8 pounds of nitrogen in one acre foot of water from the Colorado, and 28.1 pounds from the Gila, which flows into the Colorado just below Yuma. So they found in Egypt long ago that the red Nile floods from Abyssinia were more valuable than those from other watersheds tributary to that river.

Now these facts are bound to arrest attention, and when an intelligent farming community is established here, this will become one of the most productive regions of the world.

If you have seen abandoned farms in New England; if you have seen farms in North Carolina wasting away by surface soil erosion or washing, year after year; or if you have some personal experiences of the struggle with poor soils, where the loss by cropping could never quite be restored by manuring, then you ought to look with longing upon soils that will never wear out or wash away.

GOVERNMENT IRRIGATION—SOUTHERN PACIFIC



No dearth of water here in the main canal of the Imperial Valley System.

THE IRRIGATION SYSTEM

This is one of the largest undertaken by the Service. It includes a dam a mile long, seventy-five miles of levees, about seventy miles of main canals, a network of additional distributing ditches and a syphon or tunnel under the Colorado River. There is no danger of a water famine. In the present state the lowest recorded flow of the river is sufficient to irrigate an area several times larger than that embraced in the district around Yuma. Nor will there be damage from floods. This is provided against in two ways: first, by a long line of embankments. The tops of these levees, four feet above the highest known floods, have dimensions which sixty years of experience on the Mississippi have shown to be the best. Second, as the work advances immense storage reservoirs will be added along the upper reaches of the Colorado and its tributaries. These will conserve the flood discharge and allow the water to flow at a more uniform rate through the year. In other words, the Colorado will be regulated. It will be put into harness.

DRAINAGE CHANNELS

These are vastly important. The character of the lands here lends assistance to the engineer, being in general a great bed of sand overlain and interstratified with silt deposited by the river. This sandy subsoil far below the surface makes the drainage of the soil itself naturally good. But in addition drainage channels are a feature, these being designed chiefly to take care of any seepage water from the river as well as the surplus waters of irrigation. The drainage system will discharge by gravity at the lower end of the system during most of the year. These slight explanations are in order simply to assure the settler that the engineers have covered every point, and that in actual use the farmer will find an efficient and workable system, giving him no trouble for want of water, or from surplus water. Everything is done in the best manner, and with a view to permanence. This is a point which should not be lost sight of. The work is well done, done skilfully, carefully and strongly, not slighted to save expense, not hurried to get through in a given time. The system will not "go back" on the settler.

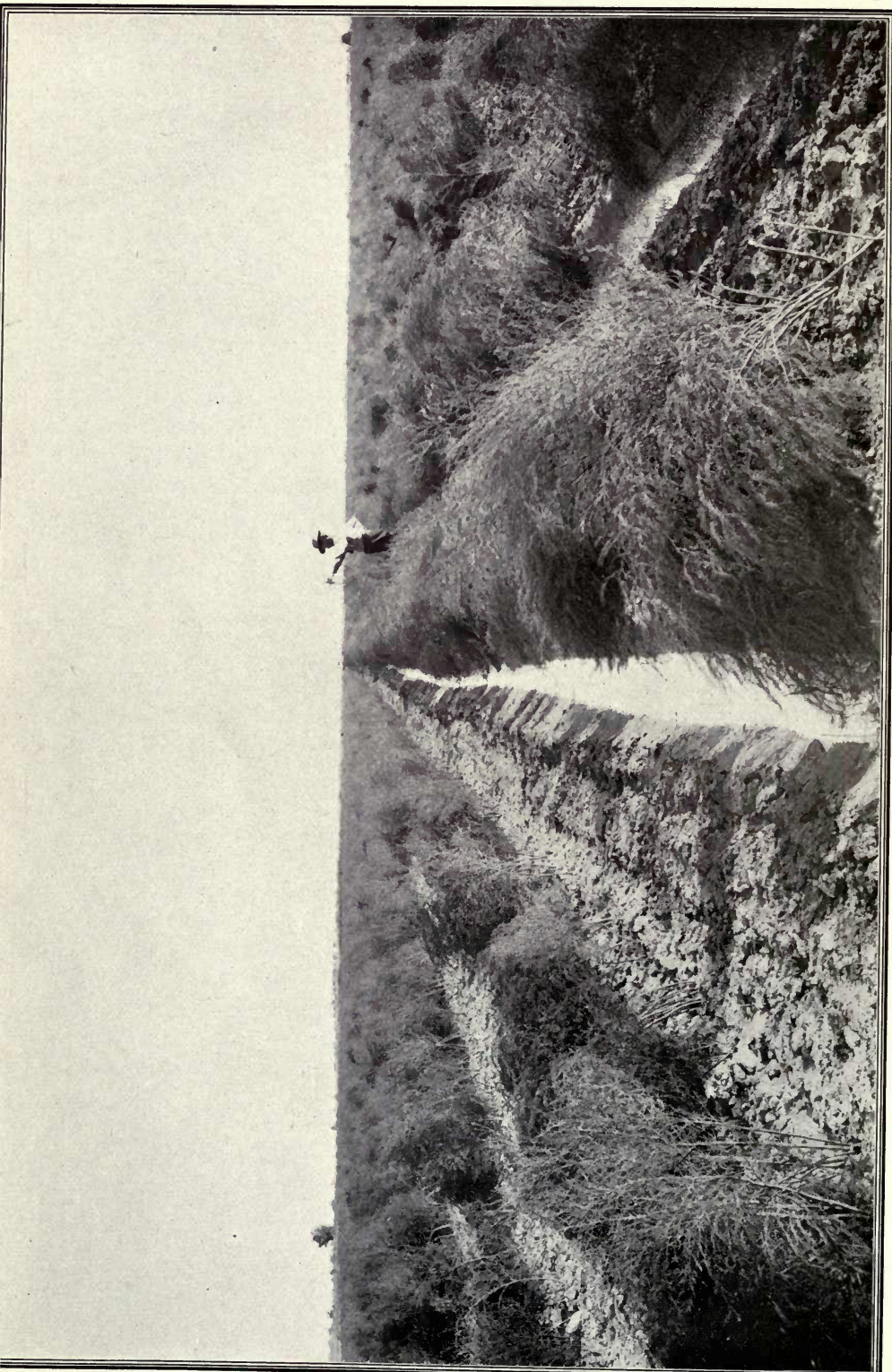
THE IRRIGABLE LANDS

These include about 17,000 acres in the Yuma Indian Reservation in California, 20,000 acres in the Gila Valley and 53,000 acres in the lower Yuma Valley, Arizona. In the latter, settlement has been long established, and about fourteen per cent of the irrigable land is supplied with water by temporary works. There is here a thrifty population and good schools and churches. Patented lands in the valley are rated at from \$40.00 to \$200.00 an acre.

Bottom lands in Arizona are mostly in private ownership. A few thousand acres are subject to partial relinquishment, when the farm unit is finally fixed, but until then there is no land for entry on the Arizona side. Some of this private land is for sale at \$30,000 and upwards.

The lands of the Indian Reservation in part have been thrown open to white settlers under the terms of the Homestead Law as modified by the Reclamation list. These Reservation lands are charged with cost of water and maintenance, and in addition a small sum per acre for the benefit of the Indians. This extra charge is fully compensated for by the character of the lands and their location.

GOVERNMENT IRRIGATION—SOUTHERN PACIFIC



Asparagus in Imperial Valley, one year old. Its profitable sale is as certain as its growth.

The rush for these lands at the opening in March, 1910, showed the interest of a wide public. Of the 174 farms, approximately forty acres each, there were about ten applicants for each farm. Successive units to be opened as the work proceeds are likely to prove as attractive as the first to homeseekers.

The Mesa lands include about 40,000 acres lying about seventy feet above the valley. These lands at present are withdrawn from entry, and will not receive water for a year or more. It will finally be lifted by pumps, but at no cost to the settler. When irrigated, the Mesa or upland portion of the project will be ideal for all kinds of delicate plant life, including citrus fruits, for it is practically frostless. More than eighty acres on these table lands are now under cultivation, and the oranges are of the finest.

FARM PRODUCTS

Alfalfa is the "stand-by," and is likely to be. This fine forage crop gives here a satisfactory cutting in about three months after sowing the seed. Seven or eight times a year it can be harvested, and a total of ten tons to the acre is not wholly exceptional. It is only a matter of proper attention and good farming. As this hay has averaged \$13.00 per ton in the local market for the last six years, it will be seen to be a profitable crop. This will not continue as the valley settles up, but will never be below its feeding value, which here is from \$8.00 to \$10.00 per ton in the stack.

Wheat yields from twenty to forty bushels, and barley from thirty to fifty bushels. These crops may be followed by corn, which can be planted in July, and is mature by the first of November—often after mid-October.

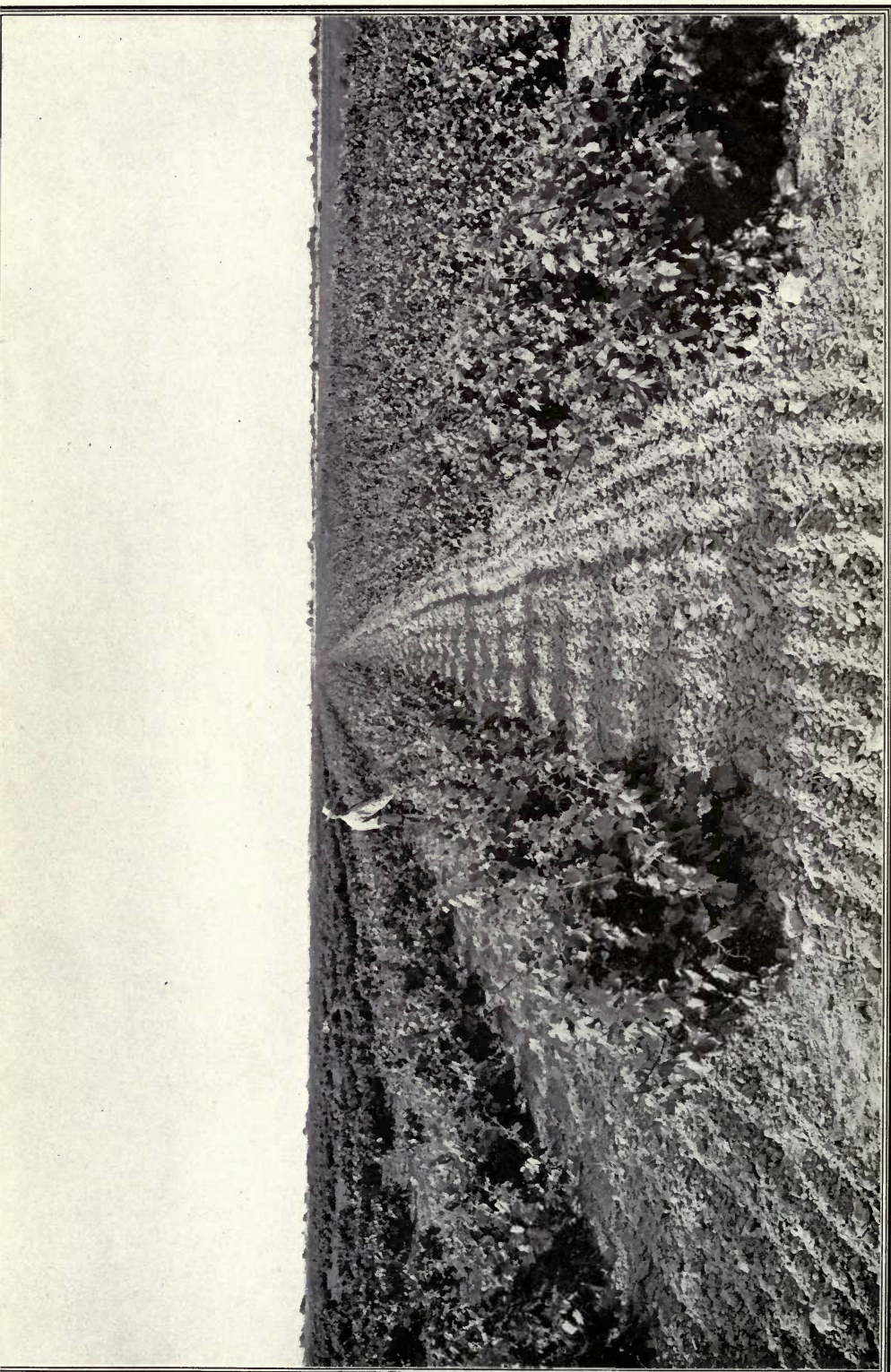
The wheat and barley sown in the fall is often pastured in the winter and harvested early in May. Alfalfa furnishes two cuttings, then a crop of seed, followed by three or four more crops of hay. Milo maize is grown, yielding about four tons of grain. Kaffir corn produces abundantly.

All this suggests the dairy and the growth of live stock, hogs grown on alfalfa and skimmed milk, and fattened on corn or barley, and range cattle bought and fattened on the farm. The market for such farm products is right at home, and there need be no trouble in disposing of all that can be produced.

Slight shelter is needed; green feed lasts all the year and mud is almost unknown. Here beyond doubt Egyptian cotton will be profitably grown, the tests being wholly satisfactory in this region. Here too will be extensive groves of oranges and lemons, of figs, also, and orchards of peach, pear and apricot. Here will be fields of asparagus and celery; berries will do well on the Mesa lands, and in the bottom lands it is certain that the date palm will flourish. The Government's date gardens have made this clear, experiments having been conducted at various places for many years. The outcome of this will be a region of farms and orchards, of date plantations and cotton fields, of general farming and intensive farming, of staple crops and high priced crops, transforming a wide area and creating beauty where now is barrenness.

THE CLIMATE

What we have said about the Salt River Valley is true of the Yuma Valley. For four months it is hot. A light breeze comes up the river daily from the Gulf which mitigates the heat. That the air is dry; that there are no "muggy days"; that evaporation is rapid, cooling the surface of the body, makes it possible to work in the fields



In the Imperial Valley. Good cultivation, climate plus water brings vines out of desert soil to this condition in

without much discomfort. There are no sunstrokes, no prostrations, no "limp" conditions in which one feels parboiled and his clothes stick to him and he swelters. This is made impossible by the extreme dryness of the air.

The body of the year is pleasant, and the winters are almost perfection. There is a little frost at times in the lowlands, but ice and snow are unknown, and as the rainfall does not average three inches in the year, mud is not lying around.

When tree planting, the growth of orchards and the expansion of green fields have changed the face of the country, and river banks have become avenues and driveways and all the face of the country is changed by cultivation, the region will then be widely known for its superb winter climate and will have its contingent of healthseekers as well as homeseekers, and this in turn will produce tourist hotels and help the growth of the town. We are not speculating; we are not "trading in futures"; the work has begun, and with a magnificent irrigation system, the broad foundation of an intense economic life has been laid, and all the higher forms of industrial and social development are sure to follow in due time.

THE WORK OF TIME

There is much to be done yet. The great irrigation system is not yet completed; work is now going on in pushing the great steel syphon under the river bed, and water is yet to be delivered, lands to be selected, cleared and leveled, and a pumping plant installed to deliver water on the uplands; but as soon as the full opening of the project is reached the work of development will be in many hands, and will go on rapidly. Meantime the man who is looking westward for a permanent home will find it to his advantage to be familiar with all the details of the situation, and if he can be on the ground he will command opportunities that will lead on to fortune.

Imperial Valley California

THE Colorado Desert will be remembered by all who have come into California by the Sunset Route of the Southern Pacific. One of the most desolate spots on the globe is the gateway to the bloom and the beauty of Southern California, yet perhaps the greatest single example of the triumph of irrigation in our day is seen in this forbidding desert.

Imperial Valley is the delta of the Colorado River in the extreme southeastern part of the state, and extending over the border into Mexico. Here, on both sides of the line are more than a million acres that probably once formed the bed of the ocean, an extension of what is now known as the Gulf of California. This has been filled up by the vast deposits of the yellow river, the head of the gulf being in the neighborhood of Yuma, sixty miles in an air-line from where it is now. It was a daring private enterprise which undertook to put water on this land, and would have been an ideal task for the Government itself. Engineers had long realized that water only was needed to convert this



Cotton in the Imperial Valley, a new crop that has demonstrated its utility.

arid desert valley into a productive agricultural area, but it was not until January 1st, 1902, that surveyors were on the ground mapping out a system of irrigation. One year later 2,000 settlers had arrived. By January 1st, 1904, 70,000 acres were in cultivation; the settlers had increased to nearly 10,000, the railroad, the telegraph and telephone had come in; many homes were building, several towns starting, a National Bank was doing business, and stores were serving the new community. It reads like a tale from the Arabian Nights, but it is absolutely true.

A GREAT PRODUCTIVE AREA

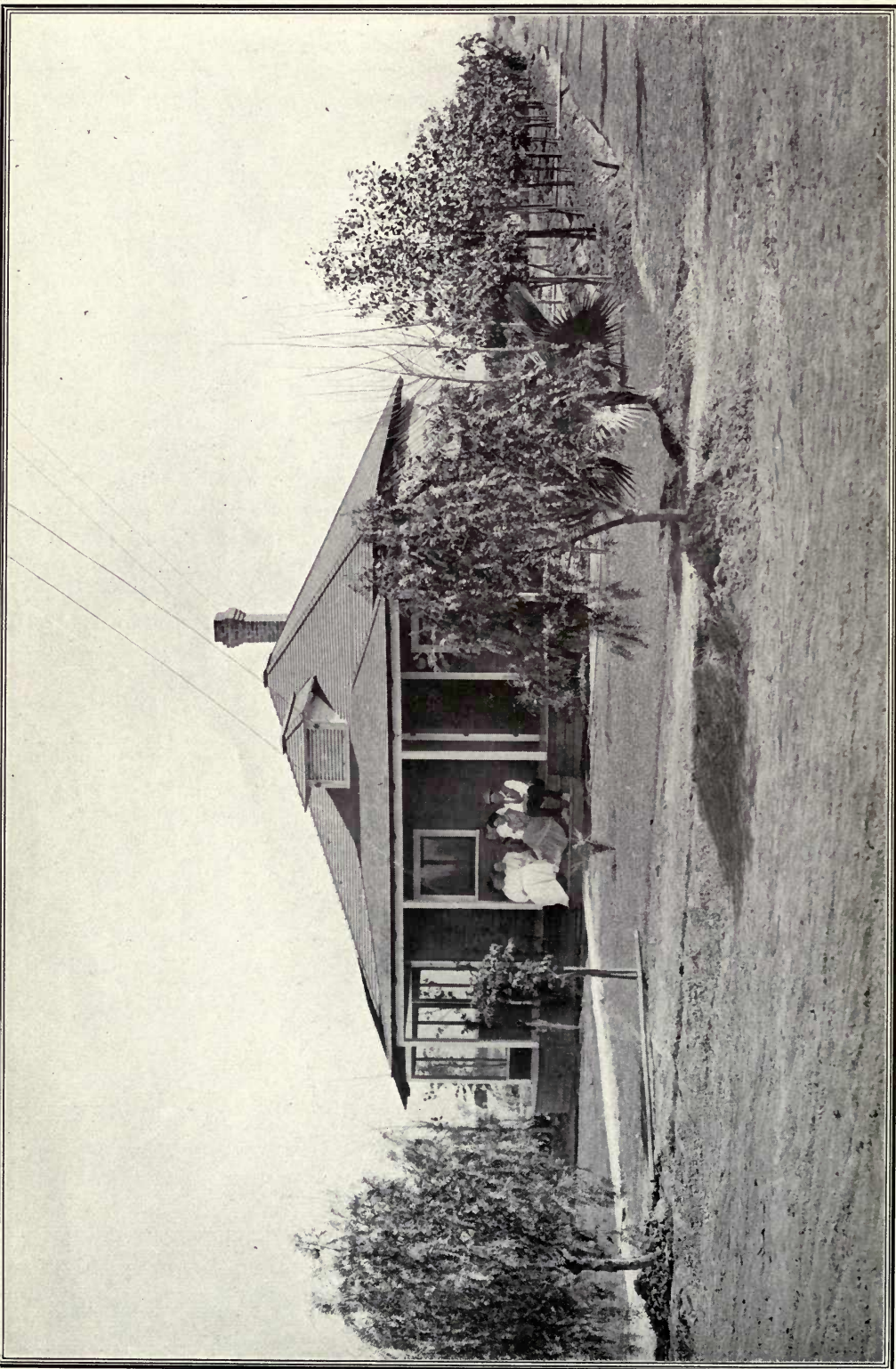
Splendid as is the truth of today, it is pale compared with the promise of tomorrow. A great river has been harnessed and brought under control and this makes all the difference between hopeless aridity and human homes and farms, supporting an independent population. Here are now 20,000 people and six towns; 275,000 acres are under cultivation, and the irrigable area is 700,000 acres. Some of this great area cannot be served by the present system, but will be reached by a high line canal brought down from the Laguna Dam. This is contemplated, and will be constructed when the demand for it becomes urgent. Meantime with water flowing in 1,000 miles of canals and laterals; with settlements expanding from the centers and new districts forming; with a great diversity of crops under cultivation and scarcely any product of California soils which will not do well here; with an ample water supply for a much larger area than is now served by the ditches, it is easily seen that the region is destined to support a large population, and the desert, if not becoming a garden has been converted into valuable farms. In 1906, with but 130,000 acres in cultivation, the returns from cattle and hogs were \$1,185,000 and from creamery products \$273,000; barley \$337,000 and cantaloupes \$95,000, and the desert surface had then hardly been scratched. Today the cultivated area has more than doubled; crops have increased in diversity and in quality, the returns per acre are more, and the wealth of the whole valley is steadily augmenting. Many began with little capital, and are now independent. The attractive farm homes, the ambitious new towns growing in population and increasing in business, the long lines of loaded cars and evidences of industrial activity all owe their existence to the waters of the Colorado. Irrigation does transform the desert.

There are now in that wonderful valley 3947 farms covering 731,520 assessed acres, and the total assessed valuation of the valley is \$7,161,382. The value of the products produced this year exceeds \$2,000,000, and its development has but just begun. It is wonderfully productive and with its abundant water supply yields crops the year around. The growing season never ends.

PRODUCTS OF THE VALLEY

The first uses of the land are generally to grow barley. The land long unstirred responds more rapidly to higher priced crops after a year or two of cultivation. Alfalfa quickly follows barley, and the tremendous growth of this forage plant makes stock raising a prominent industry. Eight tons to the acre is called a low estimate for alfalfa, and this brings usually \$10.00 per ton when shipped out of the valley.

Hogs are fed on barley and alfalfa and 3,000 have been kept on a single farm of 320 acres, the bulk of the acreage being in alfalfa. Where the latter grows all the year as here, cattle thrive and the dairy is profitable. Many head of fine stock have been brought into the valley, and creameries have multiplied.



A home that is the center of a young and prospering farm in Imperial Valley

Cotton has been grown successfully, and a carload recently shipped to Oakland Cotton Mills was pronounced of excellent quality. It is estimated that 20,000 acres will be planted this year, and a larger acreage is offered. Asparagus has proved profitable and will become a large industry. Oranges are being tried, and have matured fruit of good color and flavor, but it is too soon to determine the adaptation of soil and climate to this exacting fruit. But the orange tree will be widely planted in dooryards, if not grown for commercial uses.

Fig trees bear readily and early, and grapes are being shipped to New York by the carload. Cantaloupes can be put on the market by the first of June and are of fine quality.

The date palm may become a large feature in the landscape here, and be extensively grown. The Government date garden is at Mecca in the Colorado Desert, and the experimental planting is full of promise. Deciduous fruits of several kinds will do well, and the early bearing and vigor of fruit trees is phenomenal. Poultry flourish with little care, and great herds of turkeys range the fields and to all intents and purposes care for themselves.

The eucalyptus will furnish fuel and material for farm implements and for furniture and building. Several varieties grow well and with great rapidity. In the short space of five years or less the farm can have a self-renewing wood lot and the barns, corrals and roads can be well shaded. Cottonwood springs up from slips as do willows. The pepper tree thrives and a little attention to ornamental planting will make this great valley a place to delight the eye.

This is a prominent feature of the situation, the self-supplying possibilities of the region. The community is independent, growing all that it consumes save a few articles, as tea, coffee and sugar.

THE CLIMATIC SIDE

It is the usual story of the desert—great heat for a part of the year—but great dryness of the air and rapid evaporation reducing the sensible temperature so that work in the fields goes on at all times. That the heat of summer will be modified by green fields and trees is certain. The traditional heat of the desert is due in part to the absence of vegetation. Winds are hot blowing over hot sands, but are cooled as they blow over miles of grain and hay fields, the heat of the sun being taken up by the foliage of plants and trees.

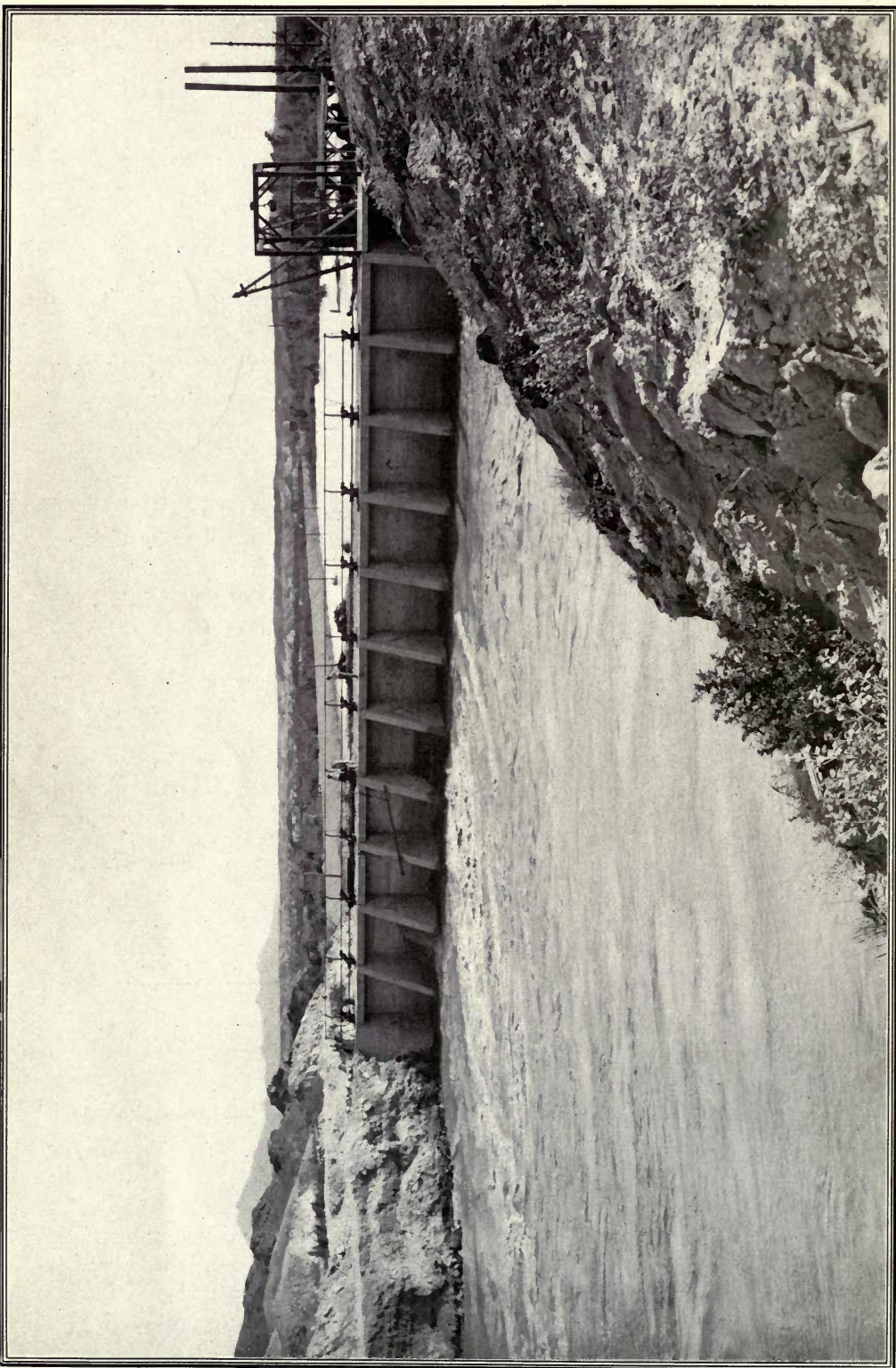
There is little rainfall, and the almost rainless winters are not cold, so that vegetation is but little affected and growth goes on all the year.

It is a land of health. This is the history of arid regions. Life is full of sunshine and this is antiseptic. We learn to live out of doors and to sleep practically in the open.

This is one of the blessings of irrigation. It makes the desert productive and habitable, and that in turn offers the boon of health to thousands.

PUBLIC LAND AND LAND VALUES

The eagerness with which men rushed into the valley and seized the opportunity to get a homestead is seen in the fact that for several years no vacant public land has been available. There will be lands open to entry when water is available for new districts,



Head-gate of the Imperial Valley Canal on the Colorado River.

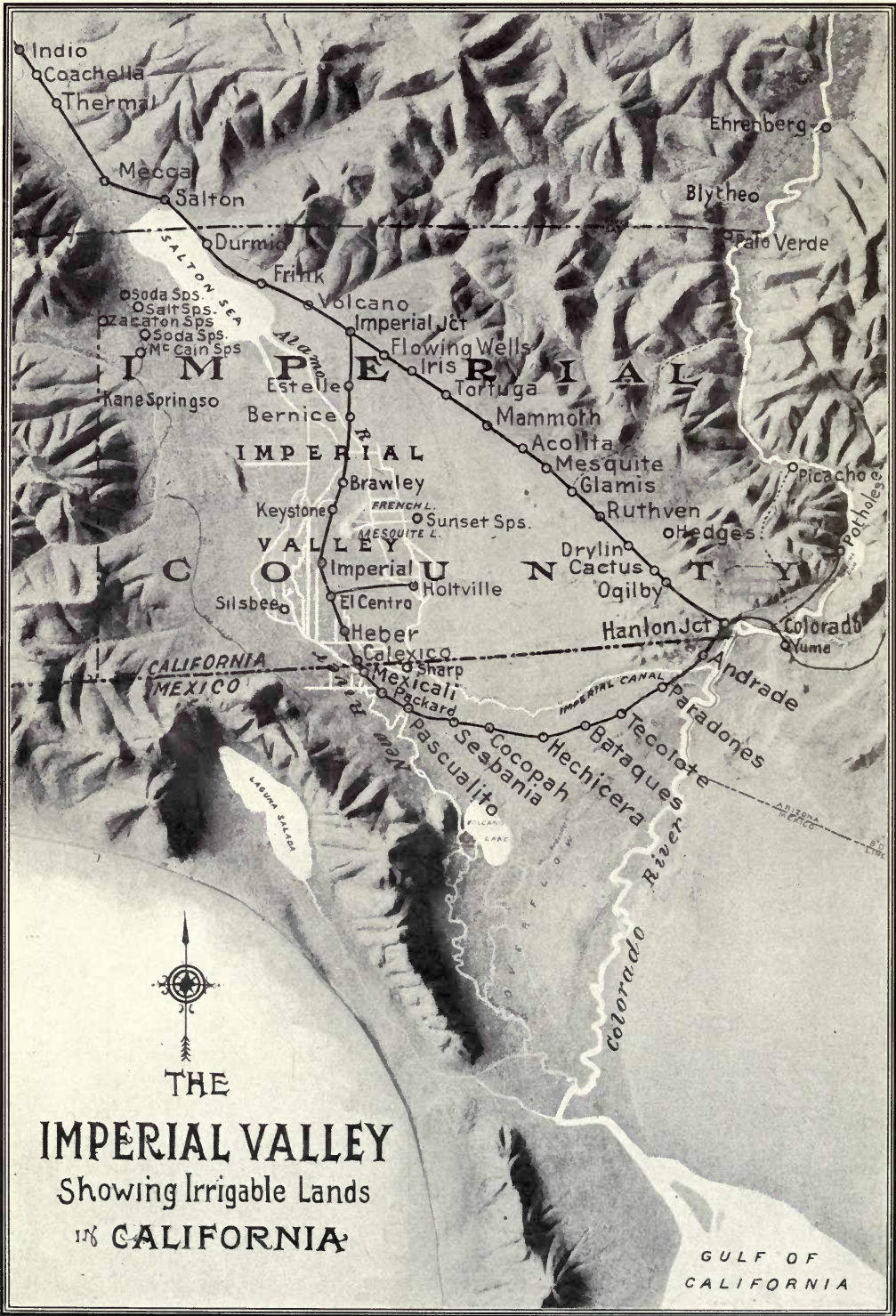
from higher sources up the river, and as the present canal system is extended and new districts are formed. But at present land must be bought from private owners at market prices. It is difficult to say what these are. Prices change rapidly. Some rough lands can be bought on the rim of the settlements, and some relinquishments can be bought, but the man who gets Imperial Valley land today at a bargain must be on the ground and wide-awake.

The towns are growing; schools are provided and churches; the opera house is here and cold storage. There are substantial hotels and banking houses; the railroad that was a branch having its terminus in the valley has pushed on to Yuma and now forms a loop from and to the main line; population is still increasing and this adds to property values. The water supply is ample, is safeguarded by legally acquired right and by substantial protection of the river banks, and the work of the irrigator is secure from abuse from excessive use of water by the great drainage channels on two sides of the valley. The soil shows no development of alkali; drainage into the old flood channels is already established, and those who know this valley best believe that the whole situation is promising, and that the valley has a great future. A new county has been organized, and all the county affairs are transacted at El Centro in the heart of the valley. In every way the foundations have been substantially laid for future prosperity, and the desert is already blossoming with the homes of men.

We have dwelt upon but a few features, and this simply to show what has been done inside of ten years. The actual results answer all the serious questions which may be asked about desert lands and desert climate and the value of irrigation. While others have been debating it, 20,000 people have come in here, taken up the land, turned on the water, and found in the fertile soil and the equable climate all the elements of a first-class security. Today property is changing hands as in older communities, but at prices which represent great profits over the original investment, while those who pay from \$100 to \$200 an acre are confident that the land will speedily pay for itself.

THE BEST SIDE OF AMERICA

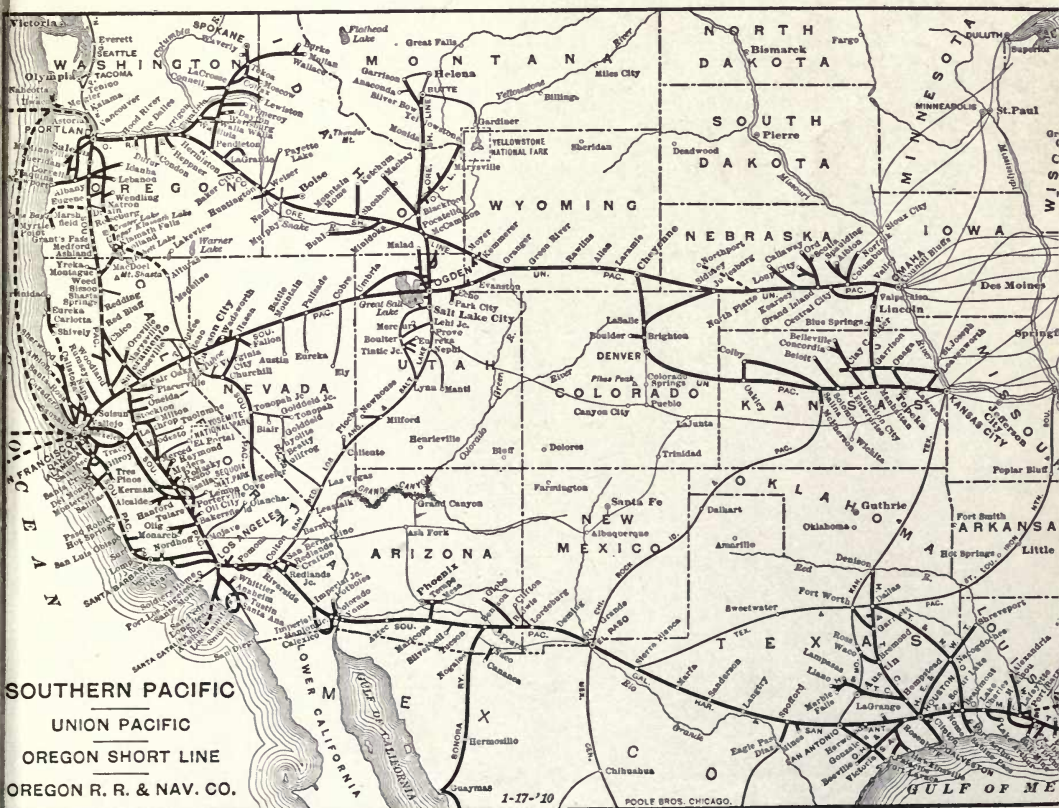
The worth of the western half of the continent has slowly made its way into conviction. There were some costly doubts where the region of assured rainfall ceased and the arid lands began, and some costly lessons were learned in the dear school of experience. Three times large regions were occupied and abandoned, settlers fleeing from Kansas and Nebraska in disappointment. But then the secret of dry farming had not been learned; the effect of tree planting had not been proved, and the age of irrigation had not come. Today in the most pronounced regions of drought farther west permanent settlements are being made, because a scientific agriculture has come in. And it is the worth of arid land now; it is the producing capacity of lands once called worthless, but which had been storing fertility under rainless skies; it is the earning power of this land under irrigation; it is the advantage of having moisture at command, to put it where your crops will need it and when they need it; it is the enlarged and assured crops, the security from rains in the harvest time, from storms that beat down crops and ruin orchards, and from floods that elsewhere drown the fields and wash away the soil, the absence of cold that here leaves winter for productive labor, and turns stock out to board themselves in green pastures; it is the development of a great region rich in natural resources, a region that is the best side of the continent, but the last to be settled because the historic movement has been always westward; it is all this that



is now drawing the attention of the world to the vast work of the Government in reclaiming dry lands to human uses, and calling settlers from every section of the East to till the irrigable valleys of the West.

And we have written these pages because the situation and advantages are not fully understood; because the superior conditions on the Pacific Coast are not fully understood and because the larger features of the work of the Reclamation Service are not apprehended, and the lands for which the Government is providing water have not been given their true setting climatically and geographically, nor the promise of prosperity and of economic greatness in the communities to be established on these irrigated lands fairly presented for the consideration of the homeseeker. We have written for the farmer, for he is the one necessary man, and he will not be slow to take advantage of the situation created for him when he understands that the object is not only to put "the landless man on the manless land," but in numbers sufficient on each project to make an independent community; that the land is ample security for the investment he is asked to make, and the conditions such that crop failures will be almost unknown; that the Government means a square deal for the plain American citizen, and that a large controlling motive here is to create "equality of opportunity" and to enable men to establish homes who might otherwise be unable to employ their energies for the best good of their families and the commonwealth.

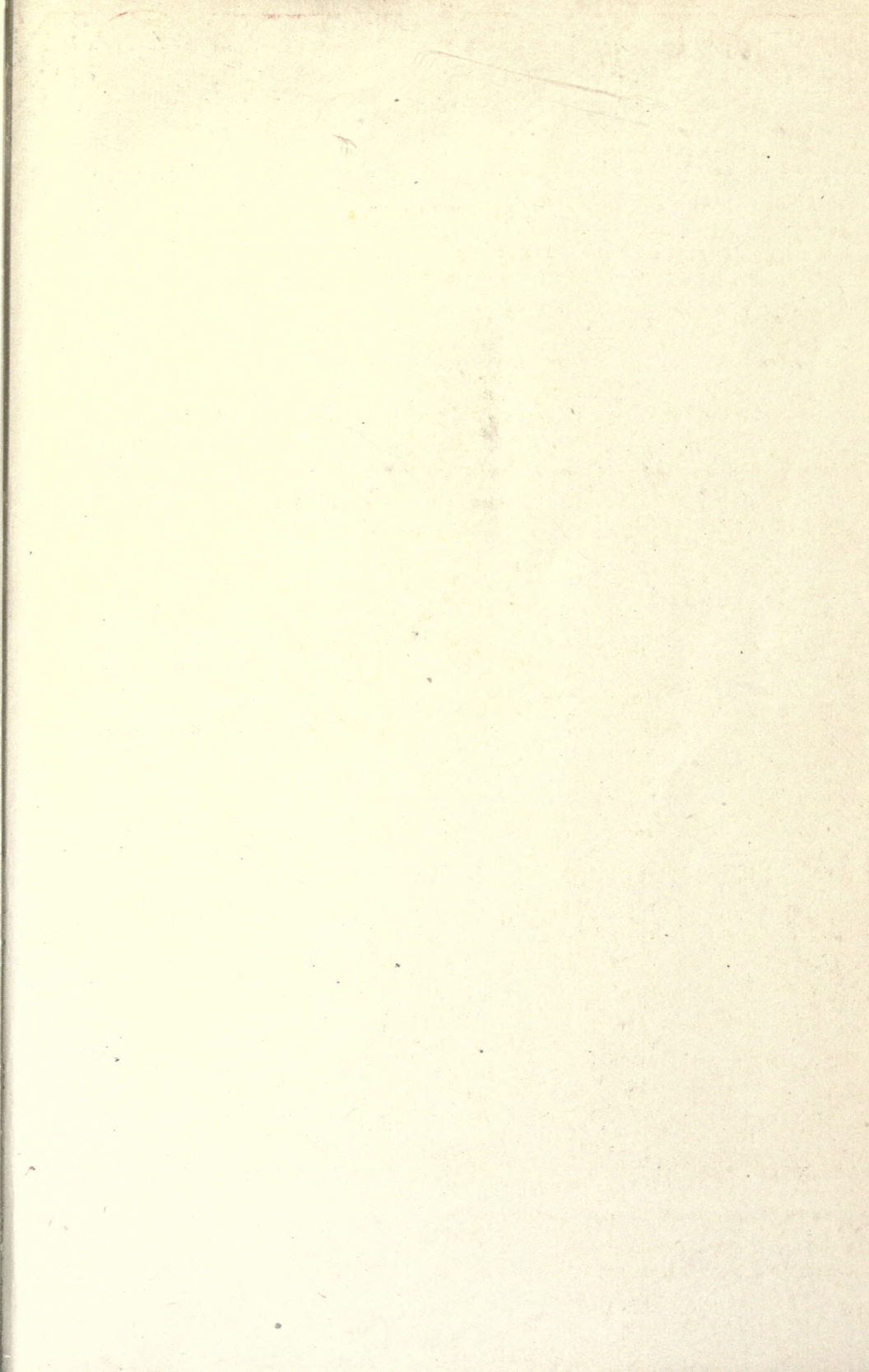
It only remains to ask those who are looking to some one of these Government projects with a view to settlement, to study the statement which the Reclamation Service has prepared, and become familiar with details which we could not well duplicate here.



Any representative of the Southern Pacific Traffic Department noted below will be pleased, on application, to furnish further information about California, including railway rates and service:

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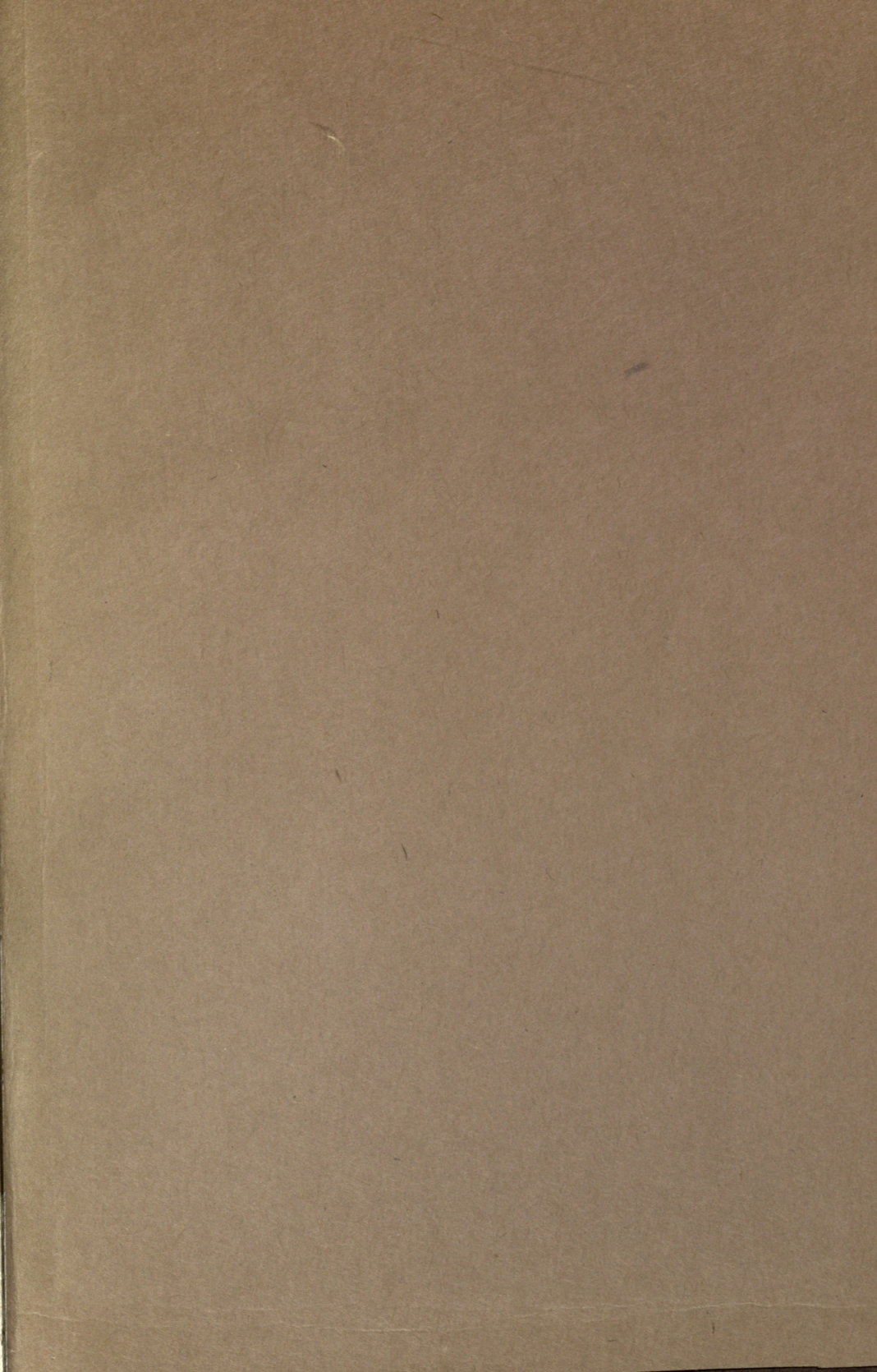


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